COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper | Second-class postage paid at Boston, Mass., and additional mailing offices
© 1976 by Computerworld, Inc.

Price: $15/year | March 22, 1976 | Vol. X, No. 12

NEWSPAPER

At D.C. Caravan

Go to Independents—Slowly, Users Told

By Catherine Arnst
Of the CW Staff

WASHINGTON, D.C. – It's worth it to go to independent peripherals manufacturers, but "don't jump into it," Ed Neff of American Trading and Production Corp. (ATP) warned Computer Caravan attendees here last week.

His company, which handles "all kinds of business all over the country," found "dealing with independents was the way to go for us, but we made some mistakes by going too fast.

"If I had to do it over again, I would investigate more first," he added, emphasizing companies must "check and recheck" before making any decisions.

ATP installed an IBM 3/10 five years ago with all peripherals from IBM because "there were no alternatives available then," Neff said.

The company installed two more 3s a year and a half later. All three systems had an IBM printer, 24K of memory and a 96-column keypunch that used IBM cards and 5440 disk packs.

ATP tried alternative 96-column cards, but found the quality "terrible" at that time, Neff said. Six months later, how-

(Continued on Page 7)

Service Bureaus Seen As Upgrade Alternate

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – Before making an expensive upgrade to handle a new application, users should consider contracting with a service bureau to avoid the kind of mistakes that come from hasty hardware selection, Tom Marshall, a computer specialist with the Civil Service Commission, told attendees at a Computer Caravan workshop here last week.

Going to a service bureau has many benefits, not the least of which is eliminating start-up costs and extra staffing, he said.

But in working with a service bureau, users must pay careful attention to writing the contract, he cautioned.

Since design specifications are probably not defined, a two-phased approach should be considered, he advised. Phase one would involve a time and materials contract which gives the service bureau responsibility for developing those specs.

Given well-defined input and output requirements, any good service bureau can develop a system and, in fact, might have an off-the-shelf application able to

(Continued on Page 7)

Suggests Six-Point Decree

CIA Urges U.S., IBM to Settle Suit

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – "It would be in the best interests of the user, the industry and indeed IBM" for the government to settle its antitrust suit against IBM with an out-of-court consent decree, A.G.W. (Jack) Biddle, president of the Computer Industry Association (CIA), said here recently.

Biddle, who proposed six platforms for such a decree, said an early resolution of the case is needed because the government's action will take up to three decades in the courts before final resolution and any outcome at that time will be based on outdated information.

IBM said last week it had not seen the proposals and therefore declined to comment, as did the government attorneys trying the case against IBM.

If the case continues, Biddle predicted, IBM will either be broken up or, "in the unlikely event that IBM comes out of the various lawsuits relatively unscathed, it will only be a matter of time before IBM becomes subject to complete and total government regulation."

Six Major Features

To prevent either outcome and to permit both users and the industry to get on with their business without the cloud of antitrust hanging over their heads, Biddle suggested a negotiated settlement with six major features.

First would be the disclosure, by IBM, of all functional interfaces and protocols, according to Biddle.

"Given that IBM has inordinate market power, it then follows that it also possesses the power to set de facto standards relative to the architecture and use of computers and their subsystems," Biddle said.

"Just as Eastman Kodak recognized that its domination of the film market was threatened by the antitrust liability associated with its control over media (film) standards," he added, "IBM must realize that it is better to disclose any new rules of the game to its competitors, thus allowing them a chance to offer compatible products and services, than to lose the ability to control its own corporate destiny through a massive divestiture program aimed at the same objective."

At the same time, Biddle claimed this would not mean that IBM would have to divulge proprietary information on the design of planned devices, but rather that the firm would "provide all information necessary to allow others to develop and produce a product that will talk to, interconnect with or otherwise be a part of the user's overall system."

Recycling of Capital

A second objective of the CIA-proposed consent decree was a "recycling" of IBM capital into lease financing for all companies in the business.

Under this proposal, IBM capital would be used to establish a "Computer Industry Acceptance Corp." that "would provide a financing alternative, a discount window if you will, which would finance standard contracts executed between IBM and its customers and between the non-IBM portion of the industry and [its] customers," Biddle explained.

(Continued on Page 4)

House Gets Bill Overturning FCC Policies on Carriers

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – A bill that would overturn many of the current competitive policies of the Federal Communications Commission (FCC) has been introduced in the U.S. House of Representatives.

Sponsored by Rep. Teno Roncalio (D-Wyo.), the proposed legislation is called the Consumer Communications Reform Act of 1976 and is designated H.R. 12323. It would amend the Communications Act of 1934 under which the FCC operates.

Introduction of the bill followed numerous reports that the Bell System was lobbying among Washington lawmakers to blunt recent FCC decisions that have been regarded as unfavorable by AT&T and its affiliated operating companies.

Calls for Reaffirmation

Under its proposed wording, the bill calls on Congress to "reaffirm its policy" that authorization of specialized carriers (such as MCI Telecommunications Corp., Data Transmission Corp., etc.) which duplicate the lines, facilities or services of other telecommunications common carriers:

"(1) involves higher charges for users of telephone exchange service by decreasing the interstate revenues that otherwise would be available for contribution to the common costs of providing telephone service throughout the U.S.;

(2) fosters inefficiencies in the utilization of national telecommunications resources through the creation of unnecessary and wasteful duplication of telecommunications lines and facilities and wasteful use of the radio spectrum;

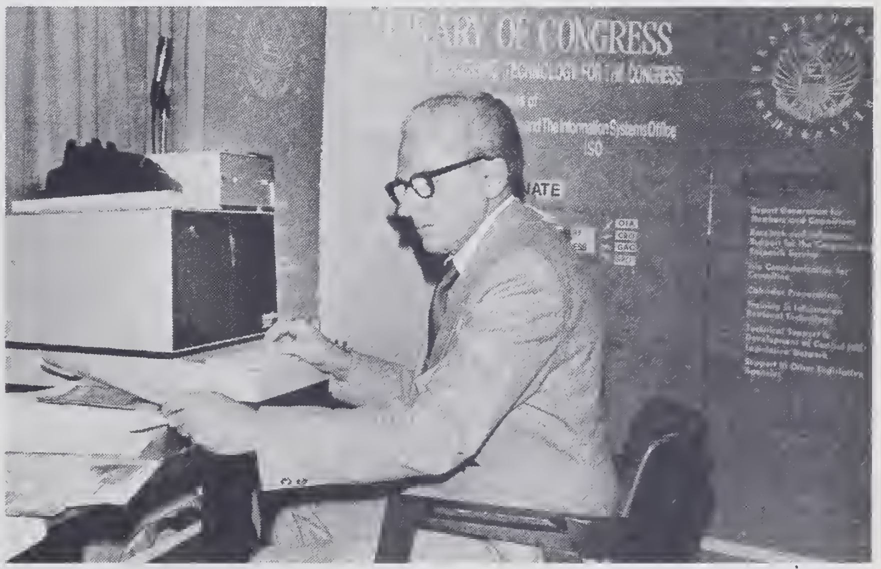
(3) significantly impairs the technical integrity, the coordinated planning, design, installation, improvement, management, operation and maintenance of the integrated nationwide telecommunications network; and

(4) has an adverse impact on the national objectives of maintaining stability of consumer price levels, conserving national economic resources, improving productivity and fostering an economy that will maintain adequate sources and reasonable costs of capital."

For these reasons the specialized carriers are contrary to the public interest, the bill said.

The legislation also calls on Congress to "reaffirm its intent that the complete authority to regulate terminal and station equipment used for telephone exchange service shall rest with the states even though such terminal and station equipment also may be used in connection

(Continued on Page 5)



CW Photo by N. French

On the Floor to the House

WASHINGTON, D.C. – A highlight of last week's Computer Caravan here was the special exhibit for members of Congress and their staffs where the Library of Congress demonstrated some of the computerized services it provides to Congress.

Shown here is William Welsh, deputy librarian of Congress, accessing the library's Subject Content Oriented Retrieval for Processing Information On-Line (Scorpio) system from a Hazeltine 2000 terminal on the Caravan floor.

Many exhibitors' terminals were linked to Scorpio as an example of how different manufacturers' terminals can be used to access the system.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
TM Reg. U.S. Pat. Off.

EDITORIAL

Editor	E. Drake Lundell Jr.
Associate Editor/ Technical News	Ronald A. Frank
Associate Editor/ Software	Donald Leavitt
Computer Industry Editor	Molly Upton
Assistant Editor/ Systems	Patrick G. Ward
Staff Writers	Catherine Arnst Nancy French John P. Hebert Edith Holmes Esther H. Surden Toni Wiseman
Chief Copy Editor	Cheryl M. Gelb
Copy Editors	Kathleen Quinn Bobbi C. Sternheim
Photography Editor	Ann Dooley
Editorial Cartoonist	Jim Orton
Bureaus:	
London	Michael R. Young
Munich	Dr. Gerhard Maurer
Asia	Hidetsuna Sasaki
Contributors:	
Education	J. Daniel Couger
Legal	Roy N. Freed
Taylor Reports	Alan Taylor
Contributing Editor	Edward J. Bride

SALES

National Sales Manager	Roy Einreinhofer
Advertising Administrator	Judy Milford
Display Advertising	Sara Steets
Classified Advertising	Debra Franchi
Sales Promotion Director	Jack Edmonston
Market Research	Kathryn V. Dinneen

CIRCULATION

Vice-President/ Circulation	Margaret Phelan
Assistant Manager	Barbara Jeannetti

PRODUCTION

Manager	Lee Vidmer
Supervisor	Henry Fling
Layout/Design	Cynthia L. Kintzer

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: 92-2529.

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 140-146 Camden Street, London NW1 9PF. Phone: (01) 485-2248/9; Telex: 264737. W. Germany: Computerworld, c/o Computerwoche GmbH, 8000 München 40, Tristanstrasse 11. Phone: 36-40-36/37. Telex: 5215350. **Asia:** Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: 26792.

Second-class postage paid at Boston, Mass., and additional mailing offices. Published weekly (except: a single combined issue for the last week in December and the first week in January) by Computerworld, Inc., 797 Washington St., Newton, Mass. 02160.
© 1976 by Computerworld, Inc. All rights reserved.

50 cents a copy; $15 a year in the U.S.; $23 a year for Canada and PUAS; all other foreign, $40 a year. Four weeks notice required for change of address.

Reproduction of material appearing in *Computerworld* is strictly forbidden without written permission. Send all requests to Walter Boyd.

Computerworld can be purchased on 35mm microfilm in half-volumes (six-month periods) through University Microfilm, Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700.

COMPUTERWORLD, INC.

Board Chairman/ Publisher	Patrick J. McGovern
President	W. Walter Boyd
Vice-President	Margaret Phelan
Consulting Editor	Dr. H.R.J. Grosch

ABC ABP AIA

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, Massachusetts 02160.
ac

Report Accepted

UN to Boost DP in Developing Countries

Special to Computerworld

NEW YORK – A United Nations report calling for action in improving computer programs in developing countries was approved by the Committee for Science and Technology for Development here recently.

The report stated that while $49.4 million has been spent by UN agencies since 1967 on technical assistance involving computer components, a number of new priority projects deserve early action.

These involve increased education and training, improved procurement capabilities, greater access to technical information and recognition of the significance of computer/communications by developing countries.

During its three-week biennial session, the committee accepted the UN Secretary General's report on "The Application of Computer Science and Technology to Development," together with a resolution calling on UN agencies and the Intergovernmental Bureau for Informatics (IBI) to prepare an implementation plan before June, when the Economic and Social Council will act on the report's recommendations.

The IBI, which deals exclusively with improving the information systems of developing countries, is expected to support several projects.

The United Nations Educational, Scientific and Cultural Organization (Unesco) and the International Labor Organization (ILO) are also expected to do so.

An underlying theme of those promoting the introduction of computers in countries where industrialization is at an early stage is to try to "narrow the gap" between poor and rich countries through technological benefits.

"Computers should not be viewed as a luxury accessible only to rich countries, but as a tool for development," the report said.

Problem of Diffusion

Some general conclusions made in analyzing the current work programs of UN bodies included the observation that "there are relatively few programs directed specifically at the issue of the transfer and diffusion of computer science and technology as a discipline."

Problems in present computer projects cited in the report involved project execution, resource availability and the difficulties experienced in coordinating the activities of the UN system due to "a broad range of functionally oriented activities."

A specific priority area recognized by the committee was in-service education and training where a "continuing problem . . . is the need to upgrade the knowledge and capabilities of staff of both computer installations and computer user organizations in order to ensure professional and technical career development.

"In-service training is needed to make it possible for those in computer installations in developing countries to select from the advances in the technology of those capabilities that will serve their particular requirements in the most effective . . . manner," the report said.

In the area of computer procurement activities, the need to identify major factors obstructing the acquisition of these products and services was emphasized.

Coupled with this was the feeling that "training and assistance is needed in order to develop systematic and scientific management approaches to the procurement" of computer equipment.

Software information transfer from one installation to another was emphasized, as was the need for standardization of "language, terms and notation . . . and, above all, program-related documentation."

The recommended activities "are so constructed as to lead to specific detailed actions within one to two years from their initiation," the report said.

Federal Reserve's Burns Says He Doesn't Heed Econometrics

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. – Presenting the President's economic report to the Joint Economic Committee on Capitol Hill here recently, Arthur F. Burns suggested econometric modeling is hardly worth the time and effort it takes.

"I don't like to talk to machines. I don't like to listen to what machines say. . .I pay attention to economic analysis," the chairman of the Board of Governors of the Federal Reserve System told committee members from the House and Senate who gathered to hear the 1976 State of the Economy Address.

Burns responded to queries on the subject of modeling, the use of computers to picture the economy and study the factors that may affect it, from senators William Proxmire (D-Wis.) and Hubert H. Humphrey (D-Minn.).

"I would like to ask you to what extent is your own relatively optimistic view of the outlook consistent with the econometric models used by your banking system?" Humphrey, chairman of the joint committee, asked.

"I really do not pay any attention to our econometric models," Burns answered. "I do my own econometric thinking. I spend a lot of time with our economists and I gain greatly from their knowledge and their judgment.

"But I do not get reports about the noises put out by our econometric models," he continued, "and I do not ask for reports on that subject. In all humility, Senator, they don't interest me. They have been so foolish and so wrong much of the time."

"Maybe we ought to economize and get rid of those econometric models," Humphrey quipped.

But, he continued, "I think they do have some useful function. I don't believe they necessarily can project with accuracy, but they give you some indication of what the impact of certain policies will be."

Burns disagreed, stating bluntly, "All they [econometric models] do is take past experience over a number of years and average it out. They don't take into account the human and psychological factors that play so large a role in economic life.

"I have often said and I firmly believe, and I think you share my belief, Senator, that hope is perhaps the most powerful of all economic factors. How we can put that into an econometric model?" Burns asked.

Lest those who regularly measure the economy with computers despair at his remarks, Burns made it clear he has learned not to pay attention "to the flurries of the stock market" as well.

"Whatever happens one day will be nullified the next day and will be forgotten – as it should be," he said.

On the Inside This Week

NEWS

IBM, AT&T Narrowly Escape Antitrust Probe by FTC 4
Minis, Micros Seen Mini in Numbers Only 5
Bill Bans Credit Data Release Without Holder's OK 9
'Nonparties' in U.S. vs. IBM Finding Trial Frustrating 10
One-Vendor Reliance Makes User 'Weak Link': Biddle . . .11

EDITORIAL

Editorial: Who Will Provide Services 12
White Hat, Black Hat: The Enthusiasts 13
Risk Analysis Missing Ingredient in DP Planning 13
User Finds DDS Performance Superior to Analog Lines . . .14

SOFTWARE & SERVICES

Retrieval Package Allows Users More Timely Data 17
Structured Code Can Be Built – Even With Cobol 18
'Joli' Cuts Job Stream Disk Needed 19
'DMMS' Eases CICS Mapping Chores 21

COMMUNICATIONS

Cost Savings Not Only Advantage of 3277 Equivalents . . .22
Users Choosing Front Ends Advised to Consider Needs . . .24

TERMINAL TRANSACTIONS

'Sonic' Net Links Vendor With Airlines Needing Parts 23
Trivex Modular Display Unit Replacing IBM 3270 23

SYSTEMS & PERIPHERALS

'Buy What's Needed,' Users Advised 25
French Reservation System Averages 99.5% Uptime 26
On-Line Systems Seen Impacting Bottom-Line Costs 27

MINIWORLD

Mini Gains $13,000 for School District 29
Agribusiness Uses Mini to Manage Farmland, Cattle 30
System Serves Purposes of Psych Lab 31
Turnkey Presents Total Solution to Recognized Need 34

COMPUTER INDUSTRY

Firms Think About Controlling Growth 35
Firms Protest 'Auctioning' of Bids by Federal Agencies . . .35
Adapso Revamps Position on Incremental Marketing 36
IMS Micro Kit Aimed at Hobbyists Good for Cash Flow . .39
Memorex Going Outside to Extend Markets 40

FINANCIAL

Modcomp Gains Slightly in 1975 50
Data Disc Loss Reflects Last-Quarter Write-Off 50

audacity

How can we possibly compete with IBM? Only by making a better sort than they do!

Call (201) 568-9700.

Find out why SyncSort is the best buy available.

Like the ancient Greeks at the Battle of Marathon, we're badly outnumbered. There are more of *them* than there are of *us*. We are, in fact, facing wall-to-wall Persians!

So we do the only common-sense thing under the circumstances. We forget about the size of our competitor and the vast extent of his Empire.

Instead, we concentrate on our products. We keep making them better and easier to use. Then we send *them* out to do battle for us. (Go get 'em, SyncSortus, boy!)

And you know something? The system seems to work. Because every time our SyncSort III-and-a-half meets up with any IBM sort — SM1-5740 (PEER/ICEMAN) or SM1-5734 — our sort package comes out on top.

Here's what you can expect if you'd like to test SyncSort III-and-a-half against the IBM sorts:

- SyncSort will save you up to 35% in elapsed time.
- SyncSort will save you up to 33% in total CPU time (problem state plus supervisor state).
- SyncSort will save you up to 40% in I/O resources.
- SyncSort will save you up to 50% kilobyte minutes in disk-space utilization.

And superior performance isn't all. With SyncSort you can count on a whole range of dazzling and unique technical features. Things like:

- Secondary allocation without inclusion in the JCL.
- Release of excess disk space — ditto.
- Non-contiguous work space.
- In-core and turnaround sorts.
- Direct communication with an invoked sort.
- VSAM.
- SyncSim for predicting resources used by sort.
- HISTOGRM for characteristics of variable-length sorts.
- Page-Fix and EXCP-VR option for VS.
- PARMEXIT for dynamic user sort control.
- I/O load balancing.
- Equals option for sort and merge.
- VIO data sets.

Unglamorous technical details? Maybe — but they're the *sinews* that make our sort such a tough and handy package. You might even say *feisty*.

Recently one of our friends — an executive with a large and respected company — alluded to this. He said our ads made it sound as though "Whitlow could walk on water."

Sorry about that! We weren't doing the talking — it was our product. And you know how noisy a truly successful product can be!

Over 750 of the world's top data processors are now using SyncSort. We'd like to add your name to the list.

We don't think that one more customer would create a monopoly problem.

OVERSEAS REPRESENTATIVES —

London, Paris, Dusseldorf, Brussels — (Gemini Computer Systems), Rijswijk (ZH) — (PANDATA), Madrid — (Entel/Ibermatica), Vienna — (Ratio), Sao Paulo — (Deltacom Do Brasil), Melbourne — (The Shell Company of Australia, Limited),

WHITLOW COMPUTER SYSTEMS Inc. 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

IBM, AT&T Narrowly Escape Antitrust Probe by FTC

By Catherine Arnst
And E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. – IBM and AT&T may have narrowly avoided a full-scale investigation for violation of a little-known section of the antitrust laws thanks to the announced resignation of two of their directors last week.

The firms had been charged with having "interlocking directors," according to sources close to the Federal Trade Commission (FTC), which has jurisdiction for investigating such matters under the Clayton Antitrust Act.

Under Section 8 of that law, firms that compete against one another are prohibited from having the same personnel on their boards of directors under the theory that if they have the same board members, they will conspire to divide the market and not compete.

IBM last week admitted it was under investigation by the FTC on the charges, but said the two directors in question – who sat both on the IBM board and on the board of AT&T's largest subsidiary, New York Telephone – were resigning from one board or the other.

Could Hurt Case

IBM is largely responsible for getting itself into the problem in the first place, industry sources indicated.

The firm has been proclaiming at the U.S. vs. IBM antitrust trial that AT&T is one of its largest competitors in the computer industry, those sources noted, while at the same time sharing directors with New York Telephone.

The FTC inquiry was designed to determine if in fact IBM and AT&T competed, in which case they would have been in violation of the Clayton Act. If, however, the FTC had found no evidence of competition, thus clearing the two firms of Clayton violations, then those results would have hurt IBM's side in the current antitrust suit, observers said.

The two directors in question were George Hinman, a Binghamton, N.Y., attorney, and Amory Houghton Jr., chairman of Corning Glass Works. Both served on both the IBM and New York Telephone boards.

However, IBM announced Hinman would retire from the IBM board of directors next month "since he has reached the mandatory retirement age of 70" and said Houghton "has informed us he is resigning from the New York Telephone board."

This apparently will be the end of the investigation, since under the law the only penalty is removal from one board or another.

In fact, some legal observers indicated Section 8 of the act is rarely enforced. When it is, just a notice of an investigation is usually enough to get the director in question to resign from one board or the other, the sources said.

CIA Urges U.S.-IBM Settlement

(Continued from Page 1)

IBM could assign $2 billion of its capital to such a corporation and then provide lease financing for up to $8 billion worth of equipment using normal leverage, he suggested.

IBM, he said, should be limited to using only 25% of the total capital of such an acceptance corporation for its own financing.

Unbundling Required

The third plank of the CIA consent proposal called for IBM "to completely unbundle all product and service offerings, i.e., to price each hardware, firmware, software and service function separately.

"Disclosure of interfaces . . . coupled with true unbundling would give the user of the future complete freedom to assemble a DP system that is both unique and optimized to his specific needs," Biddle said.

A further requirement would be the elimination of all questionable business practices in the industry and the establishment of some type of code of conduct for the industry, Biddle said.

Bans on IBM

The final two items in the proposed consent decree would bar IBM from practicing in the data services business for at least 10 years and from the communications business (as a common carrier) permanently.

The data services business, Biddle said, "provides too many opportunities and too great an incentive for abuse by an integrated supplier as large as IBM."

In the communications area, he said separate corporations are not the answer because "the potential for abuse lies in the fact that any parent corporation, and especially one as large as IBM, will doubtless sense the reality of being able to 'control' its separate corporate entities."

Furthermore, Biddle charged "any assurances that the separate entities would be prohibited from promoting or selling each other's services ring hollow. Users would not be blinded to the fact that though there are separate entities, IBM does indeed offer both data processing and communications services."

Meeting on DP Law Welcomes Laymen

SAN FRANCISCO – The Computer Law Association will hold a West Coast conference here on "Computer Law: The State of the Art" on April 22-23, and nonlawyers are being encouraged to attend for the first time.

The program will include an overview of legal problems associated with DP presented by Robert Bigelow, editor of *Computer Law and Tax Report;* an examination of DP contracting, emphasizing the problems of proprietary rights, by Reed C. Lawlor, a Los Angeles patent attorney, and an explanation of computers for lawyers by Gerald Larsen of Unicorn Systems.

Dr. Herbert R.J. Grosch, consulting editor of *Computerworld,* will speak at the luncheon on April 22.

Further information is available from Richard L. Bernacchi at Irell & Manella, Suite 900, 1800 Ave. of the Stars, Los Angeles, Calif. 90067.

We've got S/360 software to match your size.

You don't need a million bytes of core to need better throughput. A simple spooling package, for as little as $65 a month on a 36-month rental, could pull your production out of the hole and get you back on schedule.

So we've taken our award-winning DOS/RS software and created subsets to aid systems that don't want or need elaborate, sophisticated help.

With this new DOS/RS Power Line, you select what you need,.and that's all you pay for.

Dearborn's software support and training help have been given four-star ratings in independent polls. Every package is upward compatible.

DOS/RS FULL: If you need three full processing partitions, and work with a core size of at least 128k, this merit-winning software from Dearborn may be just the help you've been looking for.

It delivers six partitions. There's teleprocessing support, plus a built-in sophisticated spooler called Power-III.

With DOS/RS FULL you take advantage of 370 devices like 3330 disk drives. You enjoy new inter-partition scheduling flexibility, and throughput enhancements of such features as resident directories and transients.

A host of features are outlined in our free twenty-page reference manual. Send for it now.

DOS/RS FULL is available on permanent license, or monthly rental for as low as **$400.**

DOS/RS BASIC III: If you need the super-spooling help of Power-III, but use only two processing partitions; this subset of the full system may be ideal for you.

It offers multi-programming enhancements and inter-partition scheduling flexibility, but you only pay for what you need. As you add core and devices, it's easy to upgrade to the advantages of the full system.

Permanent license, or monthly rental as low as **$290.**

DOS/RS BASIC I: This software is perfect for the shop that's running one processing and one TP partition on one shift, and two processing partitions on other shifts.

Even with limited core, it permits you to share the efficiencies of multi-programming and spooling. Permanent license, or monthly rental as low as **$160.**

POWER-I: When it comes to cost and core, this spooling software is as miserly as they come. Yet, it's generous in features: supports one or two partitions, offers early print start and is simple to install. It's upward compatible with Power-III. Permanent license, or monthly rental as low as **$65.**

SIM14 executes 1400 programs on any 360 or 370 under any operating system. It needs no hardware emulator features. Permanent license, or monthly rental as low as **$500.**

Write for the specifications on the Dearborn DOS/RS Power Line, or call me, Lou Haberbeck at (312) 671-4410.

Gentlemen: Tell me more about

☐ **DOS/RS FULL** ☐ **DOS/RS BASIC III**
☐ **DOS/RS BASIC I** ☐ **POWER I** ☐ **SIM14**

NAME/TITLE____________________
COMPANY____________________
ADDRESS____________________
CITY/STATE/ZIP____________________
TELEPHONE____________________

dc
dearborn computer
leasing company
chicago (312) 671-4410 • toronto (416) 621-7060
st. louis (314) 727-7277 • cincinnati (513) 771-1277

But Not in Power

Minis, Micros Seen Mini Only in Leadership

By Catherine Arnst

Of the CW Staff

WASHINGTON, D.C. – "I abhor the term 'minicomputer' – both micros and minis are definitely not mini in power, only in leadership.

"They can do 95% of the data processing tasks and are 100% computer," Jay Rosenberg, president of Computer Resources and Technology Corp., told Computer Caravan attendees here last week.

In a discussion on minicomputer projections for the future, Rosenberg made it clear he believes minicomputers are the future.

"Large computer manufacturers will take a brutal beating from the mini companies," he predicted. "Without minis, the industry would be stagnant. Minis are the catalyst now."

Growth in the minicomputer industry has been "explosive" and, consequently, the industry has not stabilized along standard business lines, he said, indicating that is a good thing.

"Hardware is excellent due to the competitiveness of the industry," but in software the industry has "struck out" so far, Rosenberg said.

"Systems are a hodgepodge and support is a problem," he added while describing the present state of the industry.

Marketing is one of the mini manufacturers' strong points, Rosenberg said.

"They are incredibly good at informing the public as to what they have – although not always honestly. They sell to Wall St. and they sell for acquisition, since many of the companies are often ready to fold (due to their smallness) and hope someone will buy them," he said.

CW at
Caravan 76

The recession has also helped the growth of the minicomputer industry, he said. "It broke down IBM's supremacy; people are now willing to accept new technology" if it means savings.

In addition, there is a new generation of users which is willing to accept and experiment with new ideas, he said.

The value of the minicomputer is the satisfied customer, Rosenberg continued. "The user has learned to fit three pounds of problem into a one-pound bag.

"The small computer constrains the problem; there are usually very few problems that are not reducable," he said.

"Customers have been satisfied their fears will not materialize," he said. "They've learned you can do a hell of a lot more for a lot less if you put the energy into it."

The minicomputer industry is unpredictable even to its members, which is a plus for the user, Rosenberg believes. "It's not like Detroit, where everyone knows what's going to happen next," he said.

CW Photo by N. French

Bob Katsuda mixes business with pleasure as he tries out computer games on a Datapoint Corp. 3600 terminal at the Computer Caravan in Washington, D.C., last week. Katsuda, the data base support person for the House of Representatives' Information System, visited special exhibit for members of Congress and their staffs.

Bill Would Overturn FCC Carrier Policies

(Continued from Page 1)

with interstate services.

In various proceedings related to the interconnection of customer-provided equipment, the FCC has ruled it has jurisdiction over such services since they are interstate in nature.

This interpretation gave the FCC the power to hand down its recent ruling which eliminated Bell-required Data Access Arrangements in favor of a certification/registration program, now scheduled to take effect on May 1 [CW, Nov. 12].

The Roncalio bill prohibits the FCC from authorizing the operation of any specialized carrier unless such a specialized carrier can show that its proposed service will not increase charges for phone service and will not duplicate any services already provided by existing carriers. The burden of proof will lie with the specialized carrier applicants, the bill said.

Similar to Naruc Suit

Many of the issues raised in the bill against the specialized carriers are similar to those in a suit filed several years ago by the National Association of Regulatory Utility Commissioners (Naruc) and others. The suit challenged the validity of the FCC decision which established the specialized carriers. The FCC decision was ultimately upheld by the federal courts and a review by the U.S. Supreme Court was denied.

Various challenges have also been brought previously concerning the jurisdiction of the FCC to regulate the interconnection issue. These challenges include claims by state regulatory agencies that interconnection on noncarrier equipment should be an intrastate instead of an interstate matter. Under the Communications Act, the FCC has jurisdiction over interstate communications services.

The Roncalio bill was proposed on March 4 and was referred to the House Committee on Interstate and Foreign Commerce.

The bill probably will be set for a hearing before the House Subcommittee on Communications chaired by Rep. Torbert H. Macdonald (D-Mass.). No date has been set for a hearing, a subcommittee staff spokesman said.

"Does our
on-line system
really need
all that storage?"

TASK/MASTER
provides the answer:

The amount of storage you need depends on the communications monitor you choose. With TASK/MASTER, you will need less main storage (real or virtual) than with any other monitor with comparable features. In fact, when compared to CICS in installation after installation, savings have averaged an eye-popping 36%. Why is this?

The answer is in the basic design of TASK/MASTER. Fewer resources are required to support the needs of each application program. You don't need to allocate large blocks of storage for maps, tables, and system control areas just to get off the ground.

TASK/MASTER also has the most efficient storage management facilities ever built into a communications monitor. Storage "fragmentation" is absolutely minimized (and most of its effects are eliminated). This means that the entire on-line partition is working at peak efficiency. The result is faster response times and higher data throughput rates for both real and virtual systems.

For a more detailed answer to *"Does our on-line system really need all that storage?"* as well as the answers to many other questions, call 203/853-2884 or write for more information. Better yet, plan to attend a free one-day TASK/MASTER seminar which covers every aspect of selecting a communications monitor.

Seminars are scheduled for the following locations:

Location	Date	Location	Date	Location	Date
San Jose	4/7	Cleveland	4/28	New York	5/12
Philadelphia	4/14	Washington	5/5	Boston	5/19
Sacramento	4/21	Houston	5/5	St. Louis	5/19
Detroit	4/21	Austin	5/6	Los Angeles	5/19

norwalk · san francisco · london
additional representation worldwide

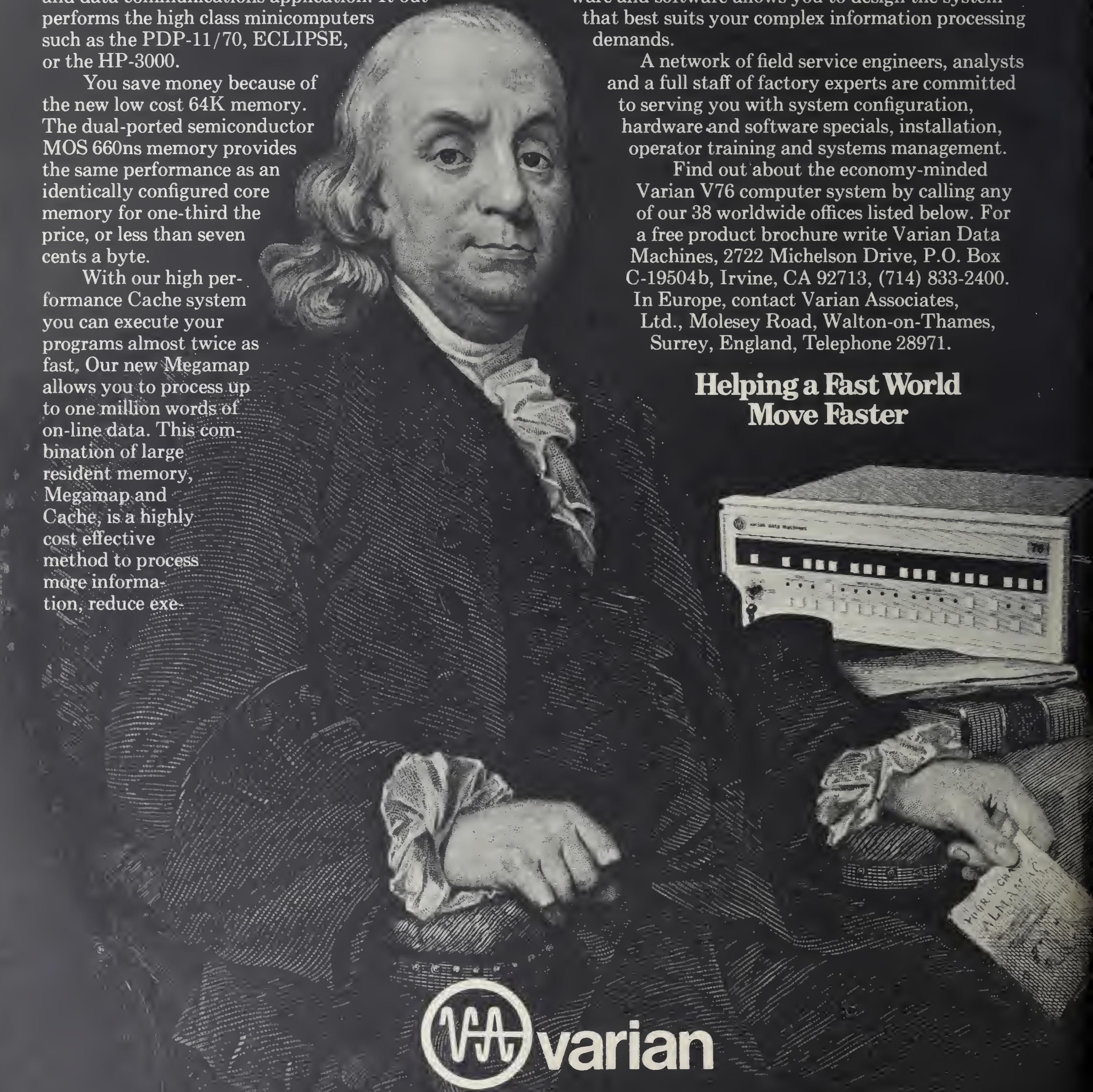
turnkey systems inc.
one eleven east avenue
norwalk, connecticut 06851

C3

☐ Please reserve _____ places at the TASK/MASTER seminar at _____ (location) on _____ (date)

☐ Please send additional information.

Name_____ Title_____
Company_____
Address_____
City_____ State_____ Zip_____
CPU_____ Terminal Type(s)_____



Varian Introduces The V76 It Remembers Time Is Money

The increasing demands of information processing obviously increases your computer time. And time is money. The V76 is a general purpose, microprogrammed computer system for scientific, industrial and data communications application. It outperforms the high class minicomputers such as the PDP-11/70, ECLIPSE, or the HP-3000.

You save money because of the new low cost 64K memory. The dual-ported semiconductor MOS 660ns memory provides the same performance as an identically configured core memory for one-third the price, or less than seven cents a byte.

With our high performance Cache system you can execute your programs almost twice as fast. Our new Megamap allows you to process up to one million words of on-line data. This combination of large resident memory, Megamap and Cache, is a highly cost effective method to process more information, reduce execution time and save additional money.

The Varian V76, with an unlimited range of application, and a broad, flexible, high-performance, open-ended selection of computer hardware, firmware and software allows you to design the system that best suits your complex information processing demands.

A network of field service engineers, analysts and a full staff of factory experts are committed to serving you with system configuration, hardware and software specials, installation, operator training and systems management.

Find out about the economy-minded Varian V76 computer system by calling any of our 38 worldwide offices listed below. For a free product brochure write Varian Data Machines, 2722 Michelson Drive, P.O. Box C-19504b, Irvine, CA 92713, (714) 833-2400. In Europe, contact Varian Associates, Ltd., Molesey Road, Walton-on-Thames, Surrey, England, Telephone 28971.

Helping a Fast World Move Faster

varian

U.S. OFFICES: Los Angeles (213) 598-4438, San Diego (714) 276-9462, San Francisco (408) 736-5630, Seattle (206) 641-4500, Denver (303) 770-2151, Dallas (214) 231-5145, Houston (713) 781-0105, St. Louis (314) 739-6433, Chicago (312) 692-7184, Detroit (313) 645-9950, Cleveland (216) 238-6960, Orlando (305) 299-1592, Atlanta (404) 252-0047, Washington, D.C. (301) 773-6670, Philadelphia (215) 643-2355, New York City (212) 325-5248, Rochester (716) 586-3273, Boston (617) 890-6072.
INTERNATIONAL OFFICES: Brussels (02) 4662000, Darmstadt (06151) 86386, Munchen (089) 8126093, Bensberg (02204) 61066, Amsterdam (020) 15 94 10, Stockholm (08) 820030, Zug (042) 23 25 75, Surrey 093 22 28971, Toronto, (416) 457-4130, Montreal (514) 332-2840, Vancouver (604) 736-5621, Ottawa (613) 224-6521, Calgary (403) 276-4456; Melbourne 560-7133, Sydney 43-0673, Sao Paulo (011) 240-3449, Singapore 2352602, Tokyo 403-7101, New Zealand 697-099, Taipei 559082.

Users Told to Get Independent Peripherals Slowly

(Continued from Page 1)

ever, the quality of the alternate cards had much improved, he said.

The company's next switch in equipment was the 96-column card equipment. It acquired one of Decision Data Computer Corp.'s first models of this type and met with several problems, Neff said.

"Rollers wore out and there were limited replacement parts" at first, he said, but these problems eventually ironed out.

When ATP bought out a company with multiple sites and had to consolidate the data in Cleveland, it talked to IBM about terminals, Neff said, but decided to go with Sycor intelligent terminals.

The company also tried using independent printer ribbons with "reasonably good luck," he said, but cautioned attendees that reinked ribbons are not really worth the money because they often wear out.

Static Electricity Problem

After the system was running, ATP discovered static electricity in winter presented a serious problem in its carpeted computer centers.

"The equipment had been tested in California and installed in the summer, so we were not aware of this seasonal problem," Neff said.

A static eliminator was put on "which helped," he said, noting there is also a solution which can be sprayed on the carpet, "but it smells terrible."

ATP decided to replace all but 8K of memory in its central processor and installed 16K to 20K of independent memory which is serviced by Sorbus.

Neff described Sorbus as a "qualified maintenance company with enough offices around." If ATP's computer center were located farther away from a large city, however, it would have problems, he said.

When ATP installed a controller developed by Business Systems Technology with Memorex drives, it experienced several problems, Neff said. The drives had been used and not refurbished properly and there was a serious problem with static electricity.

"We were down 24 hours sometimes," he said.

The company went with the independent controller because it was 33% cheaper than IBM's and the drives were faster than IBM's, he said.

"We've had the equipment in six to nine months now and we've had no problems in recent months," he added.

He told the workshop attendees they should carefully investigate users of controllers, drives, spare parts and services in all areas of the country, particularly if they live in a climate with seasonal changes, before making any equipment decisions.

There were only two manufacturers of independent printers at the time his company was looking, Neff said, and ATP went to BST, which specializes in the IBM 3 market.

"We found that, despite a difficult set-up time, we got at least one or two extra ply of paper through this printer than with IBM, and the print quality was better," he said.

But the set-up was quite complicated and there was another severe problem with static electricity, he added. BST has added some enhancements to the printer, such as a static eliminator, which will be announced in April, he said.

"The advantages of the printer have been marginal, since the downtime cost us the speed savings; we should have waited for the enhancements," he said.

"Stay away from 'serial number one' equipment," he advised. "Pay the higher price before going to newly introduced equipment. We've been too eager and we've been hurt."

But, he added, "the economical manager must be willing to take some risks. You must be willing to stick your neck out, but you shouldn't have it cut off."

Service Bureaus Seen First Step to In-House DP

(Continued from Page 1)

do the work, he noted.

Phase two should be a fixed-price contract, with a price tag on each requirement, he said.

The contract should include a provision for "product transferability" so that when the user's volume justifies an upgrade, the application can be brought in-house, Marshall said.

He also recommended specifying the use of high-level languages wherever possible for transferring ease. However, he noted, where use of real-time mode or some specific function might demand machine language, its use should be limited to subroutines, with the control program kept in Cobol or Fortran, he said.

In addition users should ensure the contract calls for the service bureau to identify any proprietary programs it might be using to avoid problems at transfer time.

For minis, Marshall urged attendees to consider Basic, which now has file manipulation capability. RPG is another fairly standard self-documenting language that can be easily rewritten, he added.

To assure the application can be brought in-house successfully, the user should assign someone from his organization to interface with the service bureau, follow development of the application and then supervise its transfer.

"As a rule of thumb, don't bring any applications running at a service bureau in-house unless you can keep a full shift of operators busy," he suggested.

Privacy Consideration

Marshall noted that attendees working for government agencies should not overlook requirements of the Privacy Act of 1974 if the data being processed by the service bureau contains personally identifiable information.

The service bureau should be informed it is responsible for "reasonable safeguards protecting proprietary as well as personal information" and would be subject to damages and criminal penalties for failure to do so, he said.

A user in the audience cautioned those present to assure Cobol programs being purchased are written by hand rather than by a Cobol generator. When the time comes to transfer that application in-house, such programs won't run well on user's system , he said.

In these cases, the service bureau "may offer to sell you the generator or maintain the application for you at a fantastic cost," the user said.

Users should be aware, Marshall cautioned, that if they specify Cobol and the service bureau writes that Cobol program for use on an IBM 370, it may not work on a minicomputer. Look at the verbs carefully, he urged, particularly the report writer, sort and other special verbs.

Facilitate Capacity Planning

Tighten CONTROL of System Resources - with Plan IV

Immediate access to key information is the basis for informed decision-making at all management levels. PLAN IV, a program product from Capex, tells you how your IBM OS or OS/VS system has performed in the past, how it is performing now, and how it is likely to perform in the future.

Broad, Informed Perspective — PLAN IV provides you with an overall view of system performance, including an accurate, up-to-the-minute assessment of areas you're concerned about. PLAN IV brings your attention to needed changes in equipment, scheduling, system performance — even individual programs. The impact of changes is observed and compared with previous performance. Trend projections show both previous and expected levels for critical measures such as CPU, TSO and device utilization, paging and job turn-around time.

Timely Information — PLAN IV highlights significant changes, pinpoints bottlenecks and automatically identifies critical programs and jobs placing the greatest demand on various resources. Whatever your level of management, PLAN IV provides timely comprehensive reporting, via more than 50 different reports and graphs. You make decisions confident that you have the best information available.

Focus on Critical Detail — More detail can be requested for any time period within the month, allowing a closer view of system operation. Periods of peak resource utilization can be easily identified and measured. PLAN IV permits you to zero in on any area of particular concern.

Whether you are a system programmer, an operations manager or vice president, PLAN IV can be of invaluable assistance to you. For more information about PLAN IV, call or write the Product Info. Dept. at Capex.

(PLAN IV can be used with the Capex OPTIMIZER II and COTUNE II packages for overall efficient operation.)

Please send me more Plan IV info.
Name ____
Title ____
Company ____
Address ____
City/State ____ Zip ____
Phone ____

capex
CORPORATION
2613 North Third Street • Phoenix, Arizona 85004 • (602) 264-7241 • TWX 910-951-1594

The inventors of magnetic tape have improved the floppy disk.

Back in 1932, BASF invented magnetic tape . . . the forerunner of such modern data processing media as the flexible disk. And now BASF research has created a better flexible disk. We call it Flexydisk I. Here's what it's all about:

First of all, our Flexydisk incorporates a unique coating and polishing technique which dramatically extends disk life. Calcomp, a leading manufacturer of floppy disk drives, tested the BASF Flexydisk and found that after 14 million passes on one track, there was no significant wear.

A second benefit of our improved coating formulation is that head wear is reduced significantly; our tests have shown it to be less than 23.5 microinches in 92 hours of head-loaded operation.

Each one of our Flexydisks is 100% certified, and preformatted for immediate use. Flexydisks have a clean, debris-free surface like our premium computer tape. And if your drive is updated, don't worry; Flexydisks are coated and finished on both sides. Just to be sure.

To keep time and use from taking their toll, we protect our Flexydisks in a special self-cleaning jacket and liner.

This little packaging extra cuts down on friction and the possibility of errors.

For complete details on BASF Flexydisks, write to BASF Systems, Crosby Drive, Bedford, MA 01730 . . . or call our nearest regional office: in Los Angeles, (213) 451-8781; in Chicago, (312) 343-6618; and in Clifton, NJ, (201) 473-8424.

BASF The Original.

Computer Tapes   Disk Packs   Flexydisks   Word Processing Supplies

Dear Computerworld:

I (borrowed) (stole) (shared) (copied) this issue of *Computerworld*, and it made me:

☐ PROUD
☐ SKEPTICAL
☐ ANGRY
☐ PLEASED
☐ INVOLVED
☐ AWARE
☐ CURIOUS
☐ EXCITED
☐ DEMANDING
☐ FURIOUS
☐ INFORMED
☐ SURPRISED
☐ ALL OF THE ABOVE

☐ PLEASE ENTER MY SUBSCRIPTION (details on back)

Put old label or label information here

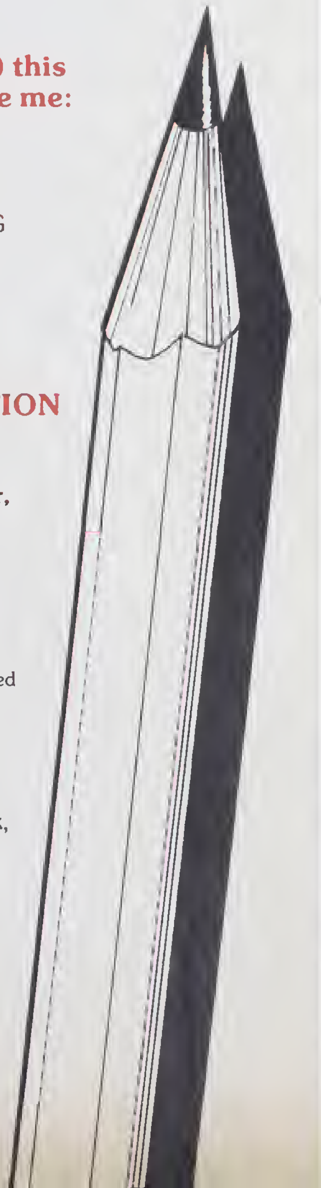
☐ I'm already a subscriber, but I'd like you to change my:

- ☐ **address**
- ☐ **title**
- ☐ **industry**
- ☐ **other**

My current mailing label is attached and I've filled in new information on the other side.

Note:
Please fill out form on back, detach and insert in post-paid envelope attached through binding.
Thank you.

COMPUTERWORLD



Please send me **COMPUTERWORLD** *for 1 year* RATES: U.S. - $15 Canada and PUAS - $23 Other foreign - $40

☐ Check Enclosed

☐ Charge My American Express Account If charge we must have cardholder's signature:

First Initial		Middle Initial		Surname	
Your Title					
Company Name					
Send to: Address					
City		State		Zip Code	

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld.*

COMPUTERWORLD

CIRCULATION DEPT. 797 Washington Street, Newton, Mass. 02160

PLEASE CIRCLE 1 NUMBER IN EACH CATEGORY

BUSINESS/INDUSTRY

10 Manufacturer of Computer or DP Hardware/Peripherals
20 Manufacturer (other)
30 DP Service Bureau/Software/Planning/Consulting
40 Public Utility/Communication Systems/Transportation
50 Wholesale/Retail Trade
60 Finance/Insurance/Real Estate
70 Mining/Construction/Petroleum/ Refining
75 Business Service (except DP)
80 Education/Medicine/Law
85 Government - Federal/State/Local
90 Printing/Publishing/ Other Communication Service
95 Other: ________

TITLE/OCCUPATION/FUNCTION

11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/ Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other: ________

Detach here, fold, and place in post-paid envelope attached through binding.

Schweiker Bill Bans Credit Data Release Without Holder's OK

WASHINGTON, D.C. – Credit-card issuers ranging from American Express to Zeke's Furniture will be prohibited from giving an individual's credit-card spending records to any third party without consent of the cardholder if a bill introduced in the U.S. Senate here is made into law.

The three-paragraph amendment to the Truth in Lending Act was introduced by Sen. Richard S. Schweiker (R-Pa.), who said he was "flabbergasted" to learn such protection was not already law.

According to a spokesman for Schweiker, the senator learned from recent Privacy Protection Study Commission hearings that American Express, Sears Roebuck and Co. and many other credit-card issuers provide spending records to credit-reporting agencies, as well as attorneys investigating both civil and criminal cases, without notifying the cardholder [CW, March 1].

'Creeping Big Brotherism'

Schweiker believes every consumer is entitled to expect a basic standard of confidentiality when it comes to personal financial transactions. "To allow open season on credit-card records for government and other investigators is to bring creeping Big Brotherism one step closer," he said.

The bill provides that a card issuer may not turn over any record or information relating to a cardholder's use of his credit card to any third party for any reason, including a subpoena, unless the cardholder is notified in advance.

An exception assures that persons who have agreed to honor a card issuer's card may still contact the card issuer to validate the existence of a credit-card account or to determine the balance of that account.

Schweiker is hopeful a recommendation of the Privacy Commission would "clear up" this problem, but such a recommendation might be two years away. In the meantime, the senator wanted to deal with this particular issue immediately, according to the spokesman.

More than half a billion credit cards are used in this country.

"If even a miniscule percentage of these credit files have been compromised, then literally millions of Americans have had their privacy invaded," Schweiker said.

Marrigan in Privacy Group

PARK RIDGE, Ill. – Robert J. Marrigan, executive vice-president of the Data Processing Management Association (DPMA), will represent the organization on the steering committee for the Center for the Study of Privacy Issues at Purdue University's Krannert Graduate School of Industrial Administration.

The center will study the benefits and costs of various approaches to the handling of personal information.

This company president just gave his computek Data Entry System a present.

Why? Because he always rewards good performance; and his Computek Data Entry System (CDES for short) really boosted profits.

With CDES, business information is entered quickly, you don't need a special keypunch department; editing takes place right in the terminal, you don't have to expand your costly central computer; vital operating reports are accurate and on time, you can make the right decisions fast; and, best of all, CDES slashes data processing costs, you save money. But what makes CDES so good? Is it CDES' powerful Data Entry Programs which allow you to enter, edit, verify and update data without going on-line? Is it CDES' efficient batch mode transmission which minimizes your communications overhead? Is it CDES' handy EASYFORM program, which tailors data entry forms to your exact specifications? Or is it advanced CDES' features, such as the ability to communicate without stopping data entry operation, which increase your productivity? No, its not just one of these, its the way *all* of them work together as a total data entry package.

No matter what size your organization, CDES gives you big system performance at small system prices. So why not let CDES put new profits in your pocket? Just fill out the handy coupon, mail it to us, and we'll have one of our marketing representatives tell you about CDES. He'll even give you some gift ideas so you can buy your CDES terminal a present.

computek®
INCORPORATED
143 ALBANY STREET
CAMBRIDGE, MASS. 02139
TEL. (617) 864-5140 TELEX 92-1464

Tell me more about CDES.
☐ send literature
☐ have a marketing representative call me

NAME ____
TITLE ____
COMPANY ____
ADDRESS ____
CITY/STATE/ZIP ____
TELEPHONE ____
APPLICATIONS NEEDS ____

Clip out and mail to: Computek, Inc.
Marketing Department
143 Albany Street
Cambridge, Mass. 02139

CW03226

erisa

PL93-406 demands accumulation of compensated and non-compensated hours affecting employees' pension.

Most existing pay/personnel systems cannot meet these requirements.

If yours is included you could find a quick remedy with a letter to Joe Nestor, Wang Laboratories, Inc., Tewksbury, Mass. 01876 or a call to (617) 851-4111. In California call Carl Tarascio (714) 631-0138. PL93-406 became effective January 1 so you don't have much time left.

WANG

As Judge Squelches Their Motions

'Nonparties' in U.S. vs. IBM Finding Trial Frustrating

By Edith Holmes

Of the CW Staff

NEW YORK – What's it like to be a part of – but not a party to – a case at trial?

If asked, some of the "nonparties" involved in the U.S. government's antitrust suit against IBM are likely to say the experience is frustrating at best.

"As nonparties in this suit," the U.S. District Court judge hearing the case has had occasion to tell *Computerworld*, "these people have as much right to be present at these proceedings as the press does."

In other words, they are to be seen and not heard in the courtroom and are to speak only when spoken to by attorneys for the government, lawyers for IBM or the judge.

Recently, a trade association, an accountant with expertise in the computer industry and an expert on the financial aspects of data processing have been unsuccessful in having their motions granted by Judge David N. Edelstein, who is conducting the trial here. At present, the president of a company in the systems business has a motion yet to be decided by the court as well.

Specifically, the Computer Industry Association (CIA) hoped to persuade the court to place documents produced by it to IBM counsel under protection so they cannot be used by the corporation for any purpose other than U.S. vs. IBM.

Felix Kaufman of Coopers & Lybrand, a noted accounting firm, asked Edelstein to rule he did not have to appear in court as an expert witness on behalf of the government. Frederic G. Withington, a financial analyst with Arthur D. Little, has also requested leave not to respond to the government's subpoena requiring him to take the stand.

Finally, Robert L. Brueck, president of MRI Systems Corp., is attempting to prevent IBM's discovery of some of his company's files.

CIA Turned Down

Edelstein has denied the CIA's request that documents already introduced to IBM in this suit be protected from use in any additional legal matters or for any other purpose. The judge also refused to grant a second motion by the association that certain documents originally withheld from the defense – including some correspondence with the press – be protected by an order of the court or by a modification of the IBM subpoena for those documents.

In memoranda to the court on Nov. 7 and Dec. 16, the CIA expressed its fear that IBM would use the information to harm the association's 35 member companies, all of which manufacture and market products and services in the computer industry.

IBM opposed the CIA motions, stating that the association had not followed appropriate procedures in filing its motions, but instead had used its papers to further an ongoing propaganda attack against the corporation.

For its part, the government entered the fray only to deny extensively through a memorandum and numerous affadavits from its attorneys that the CIA was ever employed as a consultant to the Department of Justice in its work on this case, as IBM had charged.

Edelstein noted in his opinion on the matter the CIA's first motion was more than two months late. In addition, he stated the CIA did not demonstrate the documents produced would be of any use to IBM anti-CIA activity even if the court were "willing to assume that IBM might engage in such conduct at some future time."

As for the documents, the judge said the CIA "has neither demonstrated that specific documents are in fact of a confidential nature nor satisfactorily explained its failure to identify those documents worthy of protection.

"Its conclusory assertion that sorting and designating [the documents] would be time-consuming, hazardous and a source of continuous controversy assuredly does not demonstrate good cause for the blanket protection it seeks," he ruled.

'Preoccupied With Expediting'

Commenting on the decision by the court, A.G.W. (Jack) Biddle, the association's current president, said "it is evident from this and other recent rulings on third-party motions that the court is preoccupied with expediting and protecting the record in this, the largest and perhaps most complex antitrust case in history.

"It is unfortunate that in this process the rights of nonparties on occasion may not receive full consideration," he added.

Biddle further noted "the ruling relative to the sanctity of communications between the press and its sources may serve to erode the First Amendment protection of the press that has proven so important to our nation in recent years."

Experts Ordered to Appear

Recent rulings on other third-party motions include those denying the requests of Kaufman of Coopers & Lybrand and Withington of Arthur D. Little and so ordering them to appear in court as expert witnesses on behalf of the government.

Both Kaufman and Withington contended that, as experts, they cannot be compelled by a subpoena to appear in court in an action in which they have no interest, particularly when there are other experts in their fields who might just as easily be called to be witnesses.

The judge, however, has determined he can compel Kaufman and Withington to make themselves available to testify in this case.

Since then, Kaufman and Withington have taken the matter to the Second Circuit Court of Appeals and asked that court for a writ of mandamus which, if granted, would reverse Edelstein's order.

The government has written a memorandum to the Second Circuit, suggesting the higher court dismiss the matter on grounds of improper procedure. In addition it maintained the judge does have the power to require the experts to appear in court.

Kaufman has submitted a paper opposing dismissal of his action; IBM is staying out of this dispute altogether.

The Second Circuit is considering the papers presented to it, but has not yet reached a decision on whether to grant Kaufman's request for a writ of mandamus.

Wrong Place, Right Time

Finally, in an effort to restrict IBM's discovery of his company's files, Brueck of MRI Systems perhaps sought to circumvent Edelstein's rulings on third-party motions when he took his motion to the District Court for the Western District of Texas seated in Austin in January.

But the judge in Texas suggested Brueck had the wrong court, and the MRI Systems president currently has papers before Edelstein asking that the confidentiality order governing nonparty documents in this case – Pretrial Order No. 13 – be applied to some of his company's files.

Edelstein has applied that pretrial order sparingly, however, as executives like Clarence W. Spangle of Honeywell [CW, Oct. 8] and John J. Hangen of NCR Corp. [CW, Nov. 19] can attest.

NCC '76 Exhibit Space Near Sellout

MONTVALE, N.J. – Over 95% of the available exhibit space at the 1976 National Computer Conference (NCC) has already been reserved, according to the American Federation of Information Processing Societies, Inc. (Afips), the conference's sponsor.

A total of 266 organizations plans to exhibit at the conference, scheduled for June 7-10 in New York City. As of March 1, more than 895 booths had been reserved on the first three floors of the New York Coliseum, Afips said.

The number of booths to be occupied for the 1976 NCC now exceeds the total space utilized for the 1975 conference, the society added.

Further information on the exhibit program is available from Carol Sturgeon, NCC '76, c/o Afips, 210 Summit Ave., Montvale, N.J. 07645.

LEASE 370
BUY 370

..135 ..145 ..155 ..158 ..168..

The choice is yours.
CSA will lease one to you
or buy one from you.

Contact: J. Frolick

Computer Systems of America, Inc.
141 Milk Street, Boston, Mass. 02109
(617) 482-4671

Check what $10 can buy.

Unbiased EDP and Office product reports: Characteristics/Prices/User's Ratings/Comparisons/more.

☐ Microprocessors/Microcomputers $10
☐ All About Minicomputers $10
☐ All About Small Business Computers $10
☐ All About Alphanumeric Display Terminals $10
☐ All About Typewriter Terminals $10
☐ Buyers Guide to Data Base Mgmt. Systems $10
☐ User Ratings of Proprietary Software $10
☐ Office Copiers $10
☐ Datapro Reports on Word Processing $10
☐ Photocomposition $10
☐ Duplicators $10
☐ User Ratings of Gen. Purpose Computers $10
☐ How to Select and Use Add-On Main Memory $10
☐ All About Remote Computing Services $10
☐ All About EDP Media and Supplies $10

☐ All About Modems $10
☐ All About Data Communications Facilities $10
☐ All About Data Comm. Line Multiplexors $10
☐ Buyers Guide to Data Comm. Monitors $10
☐ All About Communications Processors $10
☐ All About Data Collection Equipment $10

Trial Subscriptions to monthly updated information services (60 days). No purchase obligation.

☐ Datapro 70. The all-purpose EDP reference $10
☐ Datapro Reports on Minicomputers $10
☐ Datapro Reports on Banking Automation $10
☐ Datapro Reports on Office Systems $10
☐ Datapro Directory of Software $10

Datapro Research Corporation CWAAAA
1805 Underwood Blvd. ■ Delran, NJ 08075 ■ (609) 764-0100

☐ Please send me the items checked.
☐ Send free information only.

Name__________Title__________
Company__________Phone__________
Address__________
City__________State__________Zip__________
☐ Check enclosed ☐ Bill me, adding $2 handling.

For those who value information.

datapro
DATAPRO RESEARCH CORPORATION

☐ Send information about new Datapro Seminars.

Reliance on One Vendor Makes User 'Weak Link in Strong Industry': Biddle

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. – "The weak link in a strong computer industry today is the user. He has allowed himself to be spoon-fed by end-to-end systems suppliers for two decades," A.G.W. (Jack) Biddle, current president of the Computer Industry Association (CIA), said recently.

Head of a 36-member organization representing companies in various aspects of the computer industry, Biddle noted the CIA believes users will get systems that are more cost-effective and more tailored to their specific needs if they assemble them from a variety of peripherals, software, mainframe and terminal suppliers.

But users have been indoctrinated by systems manufacturers, and particularly by IBM, to rely on systems consisting of one vendor's equipment – be it Honeywell or IBM or Univac or Burroughs, he said.

Contrasting the efforts of the CIA with those of the Computer Business Equipment Manufacturers Association (Cbema) – whose 36 members Biddle claimed represent "a narrow segment of the industry in that they are largely end-to-end systems suppliers" – the association president said "the adoption of meaningful standards would help take away this fear of multivendor systems."

In addition, the government and large industrial users could show the smaller user the way to effective multisource systems by adopting more of them, he noted.

Emphasis on Standards

To this end, the CIA has shifted its emphasis from dedicated IBM watching to keeping its eye on IBM while working toward standards – particularly I/O channel standards – and government procurements – especially in the General Services Administration, the Office of Management and Budget and the General Accounting Office – for the smaller and usually more specialized vendors in the industry, Biddle said.

Formed in June of 1972 out of a meeting of the chief executives of seven peripherals companies, the CIA spent 50% of its first year and a half monitoring and trying to stimulate press interest in what its members saw as IBM's movement against the plug-compatible peripherals manufacturers and toward complete control of the computer industry, according to Biddle.

The other half of the association's time was used to lobby for new antitrust laws; more money for the Antitrust Division of the Department of Justice, then preparing its massive suit against IBM for trial; and informed discussion on how this or any "dominated industry" might be restructured to permit the return of competition, he added.

But while the thrust of its purpose remains "informed discussion" of the problem of relief in concentrated industries, and particularly in this industry should the government win or settle the U.S. vs. IBM suit, Biddle said the CIA has tried to balance this effort in the last two years with those in standards, procurements, the AT&T litigation and privacy concerns.

"The need for educated users is essential," Biddle said, adding, "I wish the CIA had more resources with which to do this." He indicated that without those resources, the CIA's efforts were best directed on behalf of the public through the government and the press.

'Black Art'

"When I speak of users, I'm not talking about the DP manager or the programmer or the computer operator. I mean the president of a company or the manager of a division who has little technical background, but who is responsible for his enterprise's acquisition of DP equipment," Biddle said.

Unfamiliarity with computing by machine has bred an uncomfortable feeling among these users, he noted. The traditional antagonism between top management and the DP division in companies hasn't helped ease the lack of technical competence among those who make procurement decisions, he added.

This lack of knowledge makes the end-to-end supplier a particularly attractive source of DP systems, Biddle said. IBM has been particularly adept, he added, at capitalizing on users' fears in this regard, developing what the corporation now feels it must maintain: account control.

"IBM has encouraged the user notion that DP is some kind of black art," he said.

Evidence of Apathy

Nowhere is the apathy and passivity of users more apparent than in their views of the government's antitrust suit against IBM, now at trial in the U.S. District Court for the Southern District of New York, Biddle indicated.

"The real objective behind this case and behind the antitrust laws is to give the user a choice. IBM's objective is to give the user one choice," he stated.

"Hand-held since birth, users are at the point where they're really incapable of stepping back and seeing the broader social and economic issues involved in this case.

"One way or another, there will be a change in the structure of the industry – IBM will either be regulated or restructured," Biddle continued. His encounters with users at industry meetings and conferences have convinced him "most users would rather see a restructured, as opposed to a regulated, IBM."

Judging from what he has heard of the testimony of executives from the mainframe manufacturers at the trial, Biddle said the mainframers seem to think IBM will keep them around "the way General Motors has kept American Motors and Chrysler Corp. in the automobile business."

But Biddle believes these manufacturers are mistaken. IBM will not tolerate any serious challenge to its account control, he maintained.

"Telex and Memorex became such a threat to IBM because they enabled users to assemble more cost-effective systems," and the corporation reacted accordingly, he added.

The CIA is also following the government's antitrust case against AT&T closely, Biddle said. "Benefiting from what we have learned from the IBM case over the last three years, we've come to the conclusion the legal resources of both corporations are so overwhelming that Congress must be asked to protect the public," he noted.

To this end, the CIA has backed a bill sponsored by Philip A. Hart and Hugh Scott in the Senate, the Antitrust Improvements Act of 1975 (S. 1284), which is designed to improve and facilitate the expeditious and effective enforcement of the antitrust laws.

If passed, the bill would establish a Senate judiciary to hear certain antitrust disputes, permit state attorney generals to sue for antitrust, eliminate the notion of "relevant market" in the Sherman and Clayton antitrust acts and allow the judge in an antitrust case to retain industry experts to assist him with the more technical aspects of a case.

The CIA would like to see AT&T broken up into about 27 different companies, and the bill before the Senate Judiciary Committee would call for that, Biddle said.

"We're particularly concerned that, with the marriage between computers and communications occurring at such a rapid rate, users be able to capitalize on the drastic reduction of communication costs over the next decade. If users are to benefit, then they should not be restricted as to terminal suppliers, carrier links or data encryption," Biddle said.

"Users should be able to choose whether they want Control Data Corp. Star-sized computers or a network of distributed minicomputers."

IBM and AT&T have contributed "systems architecture" rather than "product superiority" to the computer and communications industries, Biddle claimed.

If relief is formulated to govern the breakup of these corporations, it should keep these system architecture functions intact and let the free market meet the standards set by this architecture in supplying users with devices, he added.

Privacy Group Sets Hearings on Banks

WASHINGTON, D.C. – The Privacy Protection Study Commission will expand its investigation into the information-handling standards of American business with hearings into the practices of all types of banking and money-lending institutions.

The hearings will be held April 21 and 22 from 10 a.m. to 5:30 p.m. in room 2358 of the Rayburn House Office Building here.

The commission is interested in hearing testimony from individuals familiar with the information practices of commercial banks, mutual savings banks, savings and loan associations, credit unions and consumer finance companies.

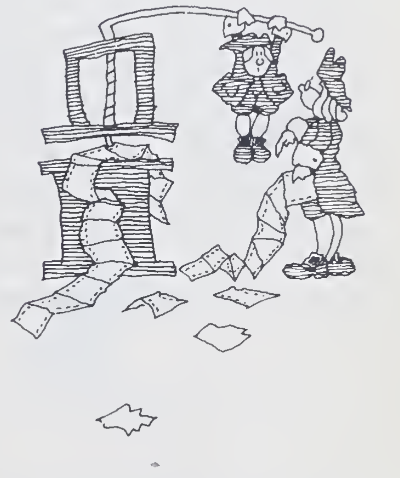
At issue is whether the provisions of the Privacy Act of 1974 should be extended to such institutions or whether other legislative remedies or no legislation at all would be more appropriate.

Those who wish to be heard should submit their testimony in writing by April 2 to the commission's Executive Director, Suite 424, 2120 L St. N.W., Washington, D.C. 20506.

MINICOMPUTER SOFTWARE DIRECTORY -1976 EDITION
Find Mini Software Services Fast
Instant access to information on hundreds
of minicomputer software packages and services.
- Supplier company profiles
- Applications/services index
- Geographic locator
- CPU's supported by supplier

Annual subscription $70.
New 1976 Edition plus 2 updates. Send check or PO to
MINICOMPUTER DATA SERVICES
20 Coventry Lane, Riverside, CT 06878
Suppliers Ask for listing info kit

GREATER PRODUCTIVITY BEGINS WITH KNOWING YOUR STAFF'S TECHNICAL CAPABILITIES.



If you knew the specific training required by each member of your staff, you'd have a more efficient shop. SCOPE is an objective way to find out what training is required.

A library of 50 scientifically designed tests, tailored to IBM 360/370, SCOPE covers • program languages • operating systems • debugging • systems analysis • design. Greater productivity begins with knowing your staff's technical capabilities...SCOPE is the first step. Find out how at a FREE SEMINAR. For more information call Bob Warburgh at (212) 486-7297. Or fill in the coupon.

I'd like to attend a FREE SCOPE SEMINAR
☐ Dallas March 25th
☐ Houston March 26th
☐ New York April 5th
☐ Washington, D.C. April 14th
☐ Chicago April 28th
☐ I can't attend, but I'd like more information on SCOPE.

Name
Company
Address
City
State Zip
Title
Phone

BCS BOEING COMPUTER SERVICES, INC
P.O. Box 708, Dover, New Jersey 07801

Editorials

Who Will Provide Services?

AT&T has announced plans to provide a specialized switched service that would serve the needs of the banking industry [CW, March 15]. And Bell officials have stated on various occasions that they believe the phone company can manipulate transmitted data in many ways strictly for purposes of enhancing the communications function.

Whether this interpretation will gain favor with the Federal Communications Commission is, of course, doubtful. In fact, the commission seems determined to lessen the involvement of AT&T in the data communications area.

For users the question is whether the phone company could provide cheaper and/or more efficient communications services than existing nonregulated time-sharing and other regulated specialized carriers.

AT&T's intensive marketing investigations have shown a user need in banking and presumably other communications-prone areas.

Above and beyond the regulatory disputes as to how far the phone company can go is the very real question of who will provide the communications services that users need to run their businesses.

FYI

Letters to Subscribers

Some subscribers have been receiving mail solicitations asking them to sign up for *Computerworld* in spite of the fact they are already on our rolls.

A few have asked us if there is any way we could cross-check our list against our mailings to eliminate present subscribers from our mailed solicitations.

We wish we could! It would save a good deal of money, and the savings in postage would certainly pay for the list matching.

Unfortunately, in most cases, when we purchase mailing lists we do not receive names and addresses in a machine-readable format. In fact, we are often not allowed even to see the list; instead, the names and addresses are affixed by a bonded mailing house.

If we could do a duplicate elimination run, we would; but under the present system it is often impossible.

We're sorry when this inconveniences any of our readers and hope you'll understand – and maybe even pass the new subscription solicitation on to someone who isn't getting CW.

The Spirit of...

During the Computer Caravan, *Computerworld* has been passing out buttons proclaiming "The Spirit of 100110," and by now several readers have caught the error.

No, we haven't invented a new numbering system. And it doesn't do much good to read it in octal instead of binary, since '46 is as bad as '38.

We'll admit it now – we goofed; there should have been one more 0 on the button.

But after all, what's wrong with remembering either 1746 or 1738 as well as 1776 during this bicentennial year?

24
IBM ANTITRUST TRIAL
BOTH SIDES AGREE ON THE TRUTH OF THIS WITNESS' TESTIMONY, YOUR HONOR...
IBM
GOVT
28
27
26
25
24
... SO HE'LL READ IT SLOWLY AND DISTINCTLY TO BE SURE YOU UNDERSTAND EVERY WORD...

Letters to the Editor

BST Has IBM 3-Compatible Printer

It was stated in the Feb. 23 issue of *Computerworld* that "Digital Associates Corp. (DAC) has what it said is the only non-IBM printer system for the IBM System/3 Model 15 available in this country."

Obviously, CW didn't bother to checkout this story, because it just is not so. Delta Steel, Inc. installed a Business Systems Technology, Inc. (BST) 750 line/min printer and control unit on Dec. 5.

We looked into the DAC printer and were not able to determine how to run it without a control unit.

I have a five-year lease with BST for its disk drives and printer. The cost of the printer is $620/mo and that includes maintenance and insurance.

I have been very pleased with all aspects of BST service and support. As a matter of fact, if BST ever comes out with a plug-to-plug CPU, I'll be one of the first to sign up.

Ron Armstrong
DP Manager

Delta Steel, Inc.
Houston, Texas

Co-Workers Support Jung's Efforts

Those of us who are co-workers of Ferdinand Jung have been sitting on the sidelines for sometime watching him carry the battle for better management of our DP resources at the Social Security Administration (SSA) [CW, Jan. 26].

The undersigned individuals generally agree that:

- Ferd Jung is technically and philosophically correct in his efforts to enlighten our management, our congressional overseers and our public.
- Ferd Jung has strength of character, an enviable quality in anyone, including a civil servant.
- A number of people offering disparaging remarks toward his efforts don't know the difference between a computer and the parking lot.

Dick Sevigny
Ray Filson
Samuel Amoss
Reese Runkles
Allen Siegel
Chuck Brigerman
Stephen R. Shepard
David Wong
Yale Mar
Luther L. Smith

Ellicott City, Md.

Programmers Not Always Writers

Peter Martin, in the issue of Feb. 23, added another bellow to the literature of discontent with what he called "computer illiterature."

Although his analysis had a certain charm and truth, I believe he missed the chief cause of the problem.

He provided a clue, probably accidentally, when he mentioned the "type" of person attracted to DP.

An installation wouldn't ask a typist to program; why should it ask a programmer to write? A programmer, whether he be immature or insecure or neither, is not, by virtue of his programming skills alone, necessarily capable of clearly explaining to his programs' users what they do.

That business ought to be left to the technical writer. A good (or even mediocre and careful) technical writer is worth, so to speak, a million words; besides improving his employer's documentation, he eases the load of the supposed DP "professionals."

R. Nelson

Toronto, Canada

(Other letters on Pages 14, 15 and 16.)

Data Past

Five Years Ago
March 24, 1971

WASHINGTON, D.C. – The Federal Communications Commission (FCC) last week reaffirmed its decision that firms who offer communications-related DP services to users should remain unregulated.

The action made final the so-called "tentative" rulling handed down in April 1970 and officially closed the FCC's computer inquiry which began in 1966.

– – –

WASHINGTON, D.C. – The privacy hearings being conducted before Sen. Sam J. Ervin Jr. (D-N.C.) nad his Subcommittee on Constitutional Rights officially ended last Wednesday; however, invitations were still out to the Department of Defense (DOD) to send additional witnesses.

In previous testimony, DOD representatives told the subcommittee about its past surveillance and buildup of files on civilians, but Ervin wants to delve more deeply into the military's activities.

Eight Years Ago
March 20, 1968

NEW YORK – IBM has come out with a 30%-cheaper version of the 360 Model 20.

This puts the system into direct price competition with the NCR Century 100, Honeywell 110 and other 1968 versions of third-generation hardware.

– – –

NEW YORK – A marketing agreement between Memorex Corp. and MAI Equipment Corp. calls for MAI to market and service the Memorex 630 disk drives, which are said to be faster than the IBM 2311s they replace.

The Enthusiasts

I have just become aware of a new and important activity in our trade, and by a considerable margin the most rapidly growing. This is the computer hobbyist/home computer idea; only two years old, yet with literally thousands of adherents up and down the country. Clubs are forming everywhere one looks; publications, from the crudest to extremely exciting and sophisticated ones (color covers, yet!), are proliferating; retail stores to sell the chips and boards and tools and manuals are springing up in unlikely places; Albuquerque, not precisely the nexus of major or mini or microaction, houses the most prominent supplier – of the ALTAIR family of computers.

I expect to attend my first Homebrew meeting, at the Stanford Linear Accelerator Center, before this column appears – found out about it at COMPCON in San Francisco. The Homebrew Computer Club meets biweekly(!), goes on for hours and hours(!!), and draws more bods than the very active ACM Peninsula Chapter(!!!). And note the host location: most of the attendees, I'm told, are pretty fancy technically. Physicists, computer science students, computer and chip-company employees, all come together to boast of their adventures, compare and exchange – I'll believe *that* when I see it – software, warn each other of the many ripoffs from advertisers and would-be suppliers, and gloat over forthcoming new microprocessor chips, printer and CRT cutdowns, interfaces with home TV sets, and (need I say) price reductions.

Over a period of less than a year, major chip outfits like Intel have gone from complete obliviousness through irritated avoidance to assiduous solicitation of this new kind of business. Unbelievable as it sounds to me, a complete and open-mouthed novice, the enthusiast market is now a very major factor, in, say, 8080 chip sales.

Everybody and his great uncle wants to build a computer – not just play with a hand-held calculator, although clearly there is an interaction, but actually put together a system with 2K or 4K (and now, only a few months into existence, people talk 16K) bytes of memory. There are cheap printers, stripped-down keyboards, interfaces to color TV equipment, even floppy disks!

It was obvious at COMPCON that there were two entirely disparate ideas afloat. On the one hand, the technician-enthusiast, the hobbyist, wants to put together hardware and write software, and play Startrek. Or control a model railroad, or whatever. But there is also a counterculture group, Great Earth Catalog types, who see the cheap home-built machine as a key to ghetto education, a counter to commercial TV, and so on. I love both of 'em; I have to say that I doubt the success of the second group, however. I admire their drive, understand their motives, despise the same politicians and the same oil companies – but alas! do not share their faith in the perfectibility of mankind. Sesame Street is great (noninteractive, of course); the Talking Typewriter is (was?) great; but TV commercials and fast foods and systematic exploitation of *underkinder* are hard, hard things to lick.

The hobbyists, though, should continue to explode in numbers and grow in sophistication. The technology is ready, the men and women – and kids – are crazy enthusiastic. There are a million things to try: cheap text editing, graphics, computer art and music, games of all kinds. Not income tax/bank balance/credit card stuff: all that needs is a $15 hand machine. But imagine the fun things our trade would do at work, if they had time and access and didn't worry that the boss would complain (the boss also belongs to Homebrew!).

A warning, though: these beasties are horrid to program in machine language, in zeros and ones. Microprocessor customers in the real world know this, and when they put on their hobbyist T-shirts they don't forget. So chip and kit suppliers talk about assemblers, and even furnish them, in a few cases. And the door is open for the software fanatic: the guy or gal who admires ALGOL or the latest nutty dialect string processor. Already we hear of TINY BASIC, BASIC, APL, simple FORTRANs and PL/Is. And operating systems, for Heaven's sake! For *Heaven*'s sake, with the whole shebang on one table top!

That's just horrible, and I spoke out as much as a complete newcomer could, at the San Francisco session. I tried to tell them about SHARE, and how the only thing worth exchanging is the philosophy and layout of programs; how the new and pretty primitive peripherals would make it hard to even read in another hobbyist's code, even if it were documented enough to be theoretically useful.

Of course, there will be hobbyist software packages, just as there is already a wild variety of hobbyist CPUs and RAMs and ROMs and I/O gear. And some of them will work, and some will even be worth buying. There is already an enthusiast standards activity – cheap cassettes (from the audio world) for peripherals. So everybody will not have to build scratch software, just as most model railroad fans don't build all their own rolling stock. But only those who ultimately hope to sell such hobby software should spend much time on, gulp, ALGOL 68. The rest should concentrate on having fun!

Herb Grosch

Risk Analysis Missing Ingredient in DP Planning

By Robert Van Brocklyn

Special to Computerworld

Over the past few years, most DP installations have come under the same corporate hammering experienced by other company divisions to prove the need for undertaking specific projects.

Management now insists on knowing the values involved before committing corporate dollars through the DP budget.

The question is does this analytical effort cover all of the activity that goes on in data processing?

Although cost/benefit analysis is now in vogue in most installations, the projects receiving this kind of scrutiny are generally those that offer clear savings in personnel, hardware or time.

All of these can be measured in dollars, though some require more analysis than others to put a fix on these dollars.

But what about activities that do not fall into these neat categories?

Unheralded in the typical annual report of accomplishments, these types of activities still comprise a fairly significant portion of the DP budget, as high as 50% of the salaries in some installations.

In most instances, the decisions to spend the dollars for this kind of work still rests with DP management, simply because corporate management has no way of knowing the value or the lack of value of these things except in the broadest terms.

For corporate management to debate these with DP management can take on all the significance of a scholarly debate on the existence of the Great Pumpkin. The winner is he who has the strongest conviction.'

Of course, the DP manager has an edge in this debate, since such a confrontation is really his second go-around on the issue. He has already discussed the need with his subordinate project leaders who requested the effort in the first place and will, as a rule, cut the request down to a size he intuitively knows can be swallowed by corporate management.

Reader Commentary

Contrary to popular belief, all projects in DP are measurable to the extent that they produce a realistic benefit or reduce a known risk.

Since cost/benefit analysis is in place, more or less, for part of the DP workload, we should address the missing ingredient required for the remainder of the work – risk appraisal.

Not Unknown

Certainly risk appraisal is not unknown to the business community. What business leader has not had to weigh the risks when opening up a new market or developing a new product?

Even in our own personal lives, we are confronted with risk appraisal daily. If you don't think so, give it some thought the next time Junior wants to borrow the car.

Typically though, examination of a risk is rather cursory and has seldom involved a quantitative look at the factors that could affect a decision. Our judgments are for the most part subjective.

Risk appraisal is not simply a recognition of a danger, but rather the determination of monetary loss should something occur, coupled with its probability of occurrence.

To know that the destruction of an entire DP installation would result in a financial loss of $5 million worth of equipment and cost an additional $5 million to rebuild can shake up an entire company.

But the picture is incomplete until you realize that the probability of occurrence may be once every 500 years.

To evaluate the data, the risk must be determined on a yearly basis. For the above example, the annual risk would be $20,000 ($10 million ÷ 500).

Now you have the information you need when planning a project that addresses the risk. DP management, knowing the annual risk, can compare it with the cost of a project or facility geared to reduce that risk and come up with a net annual risk savings. This savings can be presented to corporate management for its final decision.

Other Factors

Of course there are many other factors to be examined – ability to pay, just to name one. However, without a quantitative analysis of the project value, we cannot even get to first base in the decision process.

The determination of amount at risk and the probability of loss is certainly not an easy task, but then neither was cost/benefit analysis when first confronted.

One point to keep in mind is that in most installations the tools to measure risk have not existed and the old saw that something is better than nothing has some pertinence.

The concern should not be with absolute precision, but rather an approximate value and probability that have some basis in common sense. Refinements can be added as individuals gain experience in risk analysis.

To further clarify the appraisal process, let's take another example.

Program Maintenance

Most installations have a need for program maintenance. Although "maintenance" can have many meanings, I am referring to the effort to detect and correct program errors which delay and at times distort production system output.

If we have kept good records, we know how many times program problems have occurred (probability). Working with the users of the system's end product, we can establish the average financial impact for each type of problem.

This impact would take into consideration not only the program staff needed to correct the problem and the computer rerun time to correct the output, but also the special handling the user will have to give to offset the bad output. It is then an easy matter to scale this information to a yearly projection and to plan for the resources required to reduce the risk to a level acceptable to management.

This technique can be used effectively to place a value on all of those efforts which corporate management, indeed some DP management, have lumped into one misty category called "overhead."

Too often these so-called overhead projects have received only cursory, frequently negative reactions from management primarily because their value has never been presented in a quantitative manner.

Van Brocklyn is associate director of information services at Mass. Mutual Life Insurance Co.

Alan Taylor is on vacation this week.

Reader Commentary

Despite Start-Up Problems

User Finds DDS Performance Superior to Analog Lines

By Mitchell E. Kertzman

Special to Computerworld

Now that AT&T's Dataphone Digital Service (DDS) has been available for a reasonably significant period, a review of our experiences at Computer Solutions, Inc. (CSI) with that service may be helpful to anyone planning an upgrade from analog to digital telecommunications.

CSI is a Massachusetts corporation offering general time-sharing and on-line business services. We use the computers of our New York affiliate, J.P. Computer Systems, Inc., by multiplexing over a leased line.

Prior to last September, we were leasing a private voice-grade line from AT&T along with two Bell 208A (4,800 bit/sec) modems. All our communications hardware (Bell 113B data sets, Timplex T-16 multiplexers and the 208A modems) was virtually 100% reliable, but we were having considerable difficulty with our leased line.

In the 12 months preceding our switch to DDS, the analog circuit was unavailable to us in prime time (8 a.m. to 6 p.m.) for a total of 63 hours during 30 separate incidents involving noise and discontinuity.

During the same period, we also lost the use of the line for 82 nonprime hours, mostly for troubleshooting of the prime-time problems. We stayed with AT&T during this difficult period largely because of a lack of competing services in our area. Another reason was the promise made by AT&T engineers that the soon-to-be-available DDS would alleviate our problems.

Our DDS circuit was installed on Sept. 15, but we did not accept it until Oct. 8. The time between those dates represents a three-week nightmare of constant failures because the central office through which our circuit passed was under construction.

In addition, that central office was handling DDS for the first time, and there was some difficulty with the DDS-related equipment there.

In fairness to AT&T, I believe our start-up problems were not characteristic of DDS installations. I would, however, advise anyone considering DDS to determine whether any central office along the circuit is carrying DDS for the first time.

If that proves to be the case, I would strongly suggest holding on to the analog circuit until the digital line is functioning smoothly.

Extraordinary Performance

The real story for us, though, has been the performance of the circuit since the ironing out of the installation difficulties. That performance has been extraordinary.

Since Oct. 8 we have had only one incident. AT&T knew about the trouble (discontinuity) before we called it in, and it had us back up in less than 10 minutes. Since then, we have enjoyed virtually error-free transmission.

Since we did not incorporate error checking and retransmission into our telecommunications setup, the uncorrected performance of the line is of critical importance to us, and DDS has more than fulfilled the promises of AT&T salesmen and engineers.

I have never been known as a great admirer of AT&T, but, at least in this instance, it has earned my respect. It has provided a high-quality, reliable service which I would recommend to anyone.

Kertzman is president of CSI.

The S/370 hot line.

800-243-5307

(9AM-5PM E.S.T.)

Interested in reducing your IBM 370 costs up to 40% ?

Randolph will:
1. Purchase and lease back your S/370
2. Provide a CPU and/or peripherals on a short or long-term lease
3. Sell or lease your installed computer system for you

Call the toll-free Randolph "S/370 HOT LINE" for more information. In Connecticut, dial 661-4200.

THE FIRST NATIONAL BANK OF BOSTON
1784
RCC
RANDOLPH COMPUTER COMPANY

537 STEAMBOAT ROAD • GREENWICH, CONNECTICUT 06830

Letters to the Editor

Grosch Concept Useful; 'Hard Hats' Universal

At last Herb Grosch may have made a contribution to human understanding [CW, March 8].

For years he has divided the world into "black hats" and "white hats."

Now Grosch has given us the concept of the "hard hats," identified by their resistance to the power of Grosch's most persuasive arguments. Here indeed may be a useful concept.

We hard hats are legion, if not universal. Everyone I have ever met, including Grosch, has been resistant to having his attitudes changed.

Grosch would have us believe that "they" are not only resistant, but that "they never learn," but "we" do. We learn best and fastest from those with whom we identify.

Perhaps Grosch would be more useful and convincing if he divided less and united more, identified less and identified with more, excluded less and included more; in short, if he gave credit to every man, such as he is, for doing the best he can.

William H. Murray

Norwalk, Conn.

ON-LINE COBOL FOR MINI'S

"The total on-line system solution"

- Multiuser, Interactive
- On-Line Debugging
- Large Data Base
- Multiuser SORT
- Indexed I/O
- Multi-Branch

ANS'74 BLIS®/COBOL DOS/VS

• For more information in a hurry call

IPI 305/293-9431

6237 EDGEWATER DR. • ORLANDO, FLORIDA 32810

Letters to the Editor

Grosch Inconsistent

Why does Herb Grosch go on so about how we all should still use Assembler language and criticize "crappy IBM-type software," but still refer to Digital Equipment Corp. machines as "rather skimpily supplied with software" [CW, March 1]?

I don't want to nitpick, but somehow this seems inconsistent.

In a related vein, I can tell you something about Hewlett-Packard from first-hand experience. The HP 3000 is amply supplied with software tools for most users' needs. If the 3000 is enough machine for a particular user's requirements, he won't find it short on software.

William L. Flack
Director, Computer Center
Southern College of Optometry
Memphis, Tenn.

No Privacy Invasion

I disagree with Donald Kelley, who stated the computer output microfilm (COM) industry would be in better shape if it sold to data processing departments ["Memorex Manager: Creativity Needed to Sell in COM Market," CW, Feb. 16].

DP is vital to successful COM installation, but it is constantly bombarded with systems changes as well as equipment considerations. Why disrupt a smooth-running DP shop?

COM needs to address the user and systems. DP savings are very important to an organization, but they can be overshadowed by increased efficiencies for the user. Customer service can dictate conversion to COM separate from DP considerations.

Unfortunately, Memorex has taken the DP approach since its unit operates as a printer. It's easy for DP, but limits the user. The approach restricts our industry instead of advancing it.

Robert A. Ocon
Vice-President
Marketing
U.S. Datacorp
Portland, Ore.

Wrong Aim

"State Ends Phone Network Monitoring" [CW, Feb. 16] clearly pointed up the ludicrous ends which can be reached under a political environment (either in business or government) in claiming that any sort of information used by management is an invasion of individual privacy.

It is of interest to note the information furnished to the State of Pennsylvania by Bell Telephone Co. was exactly the same information on those calls furnished on the telephone bill anyway.

Perhaps the people who fear a "Watergate" would prefer Pennsylvania pay its telephone bill with no details whatsoever as to what the phone was used for so that there would be no "invasion of privacy."

For six years now we have been in the business of providing software to corporations and government entities with sizable telephone expenses for the purpose of allocating and analyzing those expenses. Significant savings can be made from determining when abusive use has been made of the phone, when another means of communications would have been more cost-effective, when phone calls have been billed erroneously by the phone company and when employees are wasting vast amounts of time on the telephone.

In the case of one client I can recall, it was revealed that one single employee of the night shift spent seven hours a night on the telephone to a single number.

If it is an invasion of privacy to determine how an employee is spending your money or whether he is working for you at all, I would suggest that we all give up right now.

Richard D. Connington
President
Dewey, Irwin & Co., Inc.
Nyack, N.Y.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Memory Dump

By Peter F. Gundell
Special to Computerworld

1	2	3		4	■	5	6	7	■	8		9	10	11
12			■	13							■	14		
15			16		■	17			■	18	19			
■		■		■	20					■		■		■
21		22		23	■	24			■	25		26		27
	■	28			29	■		■	30				■	
31	32	■	33			34	■	35				■	36	
37			■	38							■	39		
40		■	41				■	42			43	■	44	
	■	45				■	46	■	47			48	■	
49	50				■	51		52	■	53			54	
■	55			■	56					■	57			■
58			■	59	■	60			■	61				62
63			■	64							■	65		
66					■	67			■	68				

ACROSS

1. Code structure
5. Home of IBM, RCA, DEC etc.
8. Tape or disk ______
12. Vim
13. Tape unit
14. French article
15. Harden
17. Play part
18. Tape or card ______ (P1)
20. Up and about
21. ______ or buy
24. Olympic ruling group (Abbr.)
25. Monkey-like
28. Decades
30. Glide, skim
31. Semiconductor mfr. (Abbr.)
33. Wound leftover
35. Treaty
36. Symbol for lead
37. Recede
38. Skip from page to page
39. ___-conditioning
40. Room (Abbr.)
41. Goodbye (Span.)
42. Hint
43. Ratio of circumference to diameter
45. Odd or ___ parity
47. Nine (Prefix)
49. Work hard
51. Pronoun
52. Magnetic ______ (P1)
55. ''Literal'' statement (Autocoder)
56. Program language
57. Army bed
58. ___ -10 (Check Digit)
60. New Deal law (Abbr.)
61. Scratchy
63. Mister (India)
64. See 56 across
65. Secreted
66. Unexpurgated
67. ___ or no
68. Relative of 53 across

DOWN

1. Monkey
2. Switch found on IBM 1401
3. Main computer unit
4. Frozen water
5. American standard
6. Part of a disk
7. Garret
8. The accused (Abbr.)
9. Sick
10. Averts
11. Curve
16. Wiles
19. Computer fodder
21. Program constant
22. In that place
23. One who puts into symbols
25. Receivable or payable
26. Program ______ (Name)
27. Analog/digital computers
29. Copying machine mfr.
30. French room
32. Computer mfr. (Abbr.)
34. Old car
35. Enlisted man's rating
36. Playing card spot
41. Swear
43. Make into law
45. Relative of 1 across
46. Return payment
48. Long periods
50. Decorate
51. White with age
52. Bellows
54. Moral code
58. Lansing campus (Abbr.)
59. Frequently (Poetic)
61. Asian country (Abbr.)
62. Dist. Meas.

(Answers in next week's issue.)

GREATER PRODUCTIVITY BEGINS WITH KNOWING YOUR STAFF'S TECHNICAL CAPABILITIES.

Does your installation have the technical knowledge needed to perform efficiently? Find out easily through SCOPE.

A library of 50 scientifically designed tests, tailored to IBM 360/370, SCOPE covers • program languages • operating systems • debugging • systems analysis • design. Greater productivity begins with knowing your staff's technical capabilities...SCOPE is the first step. Find out how at a FREE SEMINAR. For more information call Bob Warburgh at (212) 486-7297. Or fill in the coupon.

I'd like to attend a FREE SCOPE SEMINAR
☐ Dallas March 25th
☐ Houston March 26th
☐ New York April 5th
☐ Washington, D.C. April 14th
☐ Chicago April 28th
☐ I can't attend, but I'd like more information on SCOPE.

Name ______
Company ______
Address ______
City ______
State ______ Zip ______
Title ______
Phone ______

BCS BOEING COMPUTER SERVICES INC
P.O. Box 708, Dover, New Jersey 07801

You said, 'APL is great, but...'

PRODUCTIVITY!

Now BCS offers a greater APL... no 'buts' about it!

Some say APL may be the most significant development since the introduction of Arabic numerals to replace Roman numerals. And most people who have been heavily exposed to it will admit that APL is the most important development since COBOL. But many time-sharing users, while agreeing that the productivity of APL programming is fantastic, say that their previous commitments and heavy investments in other software languages make APL a bit impractical for their purposes. BCS listened, then we did something about it.

Now BCS offers a quantum leap in APL capability — MAINSTREAM® APL.

- Fully competitive in price and capability
- Calls both FORTRAN and Assembler subroutines from APL
- An exceptionally powerful editor in addition to the standard APL editor
- Lets you read COBOL and FORTRAN data files from APL
- Lets you access several other languages on the same machine
- Easy to learn — and the training is free.

With APL, BCS will run your existing timesharing programs (APL, FORTRAN, COBOL, etc.), get your new development efforts off to a flying start, and show you how to accomplish two to five times more work in the same amount of time—and there's no buts about it. Find out how by calling Jim Rough at (206) 773-9090, or fill in the coupon below.

We can help.

BCS BOEING COMPUTER SERVICES, INC

D-1

Boeing Computer Services, Inc.
P.O. Box 708
Dover, New Jersey 07801

I'd like to know more about MAINSTREAM-APL, no "buts" about it.

☐ Current APL user
☐ Interested in using MAINSTREAM-APL
☐ Interested in consolidating all of my timesharing on one machine
☐ Information for my files only

Name ______________________
Organization ______________________
Title ____________ Phone ____________
City ______________________
State ____________ Zip ____________

Letters to the Editor

Naming 'Professionals' Means Culprits Not Far

Kenniston W. Lord Jr.'s proposal that DP installations should be presided over/controlled by a licensed DP professional has some value.

It is perfectly obvious this industry is light years away from perfecting the techniques that can provide assurance that a major software system is "correct." Us programmer-grunts are never sure the damned thing is going to work right all the time, and neither could Lord's "professionals" be sure.

Therefore when the system blows up and huge amounts of money are lost, or worse yet somebody gets shot, the district attorney won't have far to look for the culprit. Better that the "licensed professional" responsible for the system goes to the pokey than me.

Larry L. Galen
Cornwells Heights, Pa.

Help for Small Users

The recent special report on software packages noted several file retrieval/report generator programs are available for DP auditors [CW, Feb. 23]. The emphasis was on packages for large systems.

A similar package was introduced last fall for IBM 3 installations. It is called SYS3Audit, and information is available from Computer Audit Systems, Inc. in West Orange, N.J.

Joseph T. Rigo
New York, N.Y.

New Word for the Field

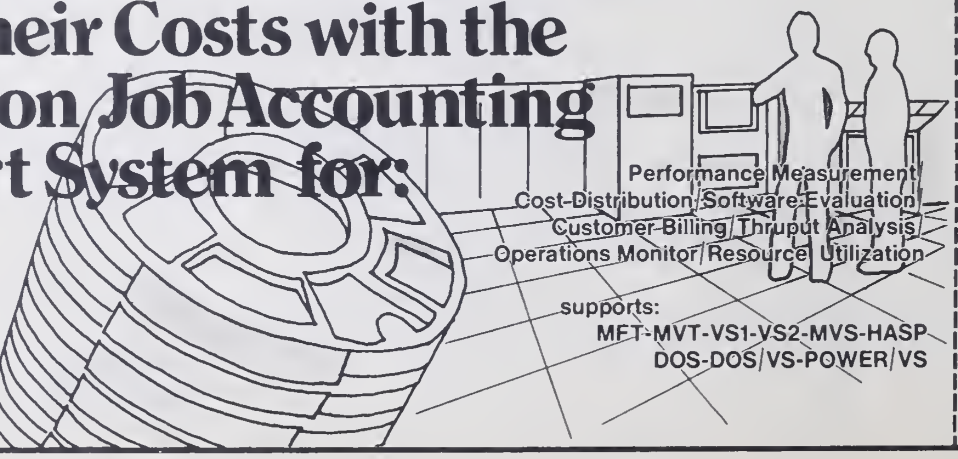
I propose that a new word be added to the language of the data processing field. It is a very descriptive term that my son (second-grader) recently invented.

It is fraught with meaning and seems to have thousands of opportunities for use in our field.

The word is "succailure" (pronounced suk sal' yur).

J.G. Sowa
Mechanicsburg, Pa.

Over 500 DP Managers Have Cut Their Costs with the Johnson Job Accounting Report System for:



Performance Measurement
Cost-Distribution/Software Evaluation
Customer Billing/Thruput Analysis
Operations Monitor/Resource Utilization

supports:
MFT-MVT-VS1-VS2-MVS-HASP
DOS-DOS/VS-POWER/VS

Send TODAY for a FREE copy of our 30-page Systems Characteristics Manual

JOHNSON SYSTEMS, INC.
Westgate Research Park, 1651 Old Meadow Road,
McLean, Virginia 22101, 703-893-8700

NAME ______________________
TITLE ______________________
COMPANY ______________________
ADDRESS ______________________ (STREET)
______________________ (CITY) (STATE)
____________ (ZIP) PHONE ____________
COMPUTER ____________ OPERATING SYSTEM ____________

Eliminates Firm's DP Bottleneck

Retrieval Package Allows Users More Timely Data

By Don Leavitt
Of the CW Staff

WOODRIDGE, N.J. – Faced with an unacceptable time lag between the collection of marketing information and its availability for decision making, management at Amerada Hess Corp. "decided to eliminate, wherever possible, the bottleneck between the user and his data," according to Tom Carpenter, the company's manager of system research.

Conventional programming seemed to be the bottleneck. That left Amerada Hess with three choices, Carpenter said: "Teach the users go program; write our own utility retrieval system; or buy or lease a report generator package."

The first two options were ruled out as impractical and Carpenter was given the task of finding a suitable package. Starting with a list of 50 candidates found in various references, he developed an evaluation system which measured price, performance, flexibility and capability.

To be acceptable, a retrieval/reporting system had to have more than a basic arithmetic capability, Carpenter decided. It also had to provide at least five levels of totals, to allow selection and sorting of multiple fields, and, most important, it had to be usable by people without DP experience, he added.

Amerada Hess had decided to allow the user to have direct access to his data.

Upper management accepted the concept of a generalized system that could be used by clerical staff, and Carpenter's search led finally to the Data Analyzer package from Program Products, Inc. (PPI).

Shortly after the Analyzer was installed, Carpenter encountered two problems. "We were not able to keep up with user requests to establish dictionaries defining data files, and – to clarify our own poor documentation – we had to research exactly what data was available in each system and define the characteristics of the data."

Once those problems were solved, use of the system grew "tremendously" – and Carpenter felt he should stop and audit the use of the Analyzer. He had estimated initially that 50 to 100 one-time requests per month would justify the cost of the package.

After the first month, 25 to 50 requests per month were being handled. Within the first year, the figures jumped to some 300 per month. In any case, by the end of the first six months the level of use had "more than paid for the system," Carpenter said.

Hess maintained a level of 300 requests each month until late 1973 or early 1974 when the Federal government imposed an allocation system on oil companies in the wake of the Arab embargo. Special reporting runs doubled in volume and "we were grateful" for having the Data Analyzer, Carpenter continued.

The Equal Employment Opportunity reporting requirements of the government added to the load handled by the retrieval/reporting software. In December of 1974, Amerada Hess processed 1,300 Data Analyzer requests, 500 of which were generated from 95 scheduled daily, weekly and monthly runs.

Although end-user departments are free to use the system as the need arises, Carpenter found the DP department itself is one of the heaviest users.

The department also produces daily and weekly reports of program testing and project schedules for each supervisor to show what programmers are doing, how much testing was undertaken and what the turnaround time was for the tests.

By using SMF records from the operating system, "operations" has scheduled production work along with the test sessions and the Data Analyzer requests.

With this starting point, the department has been able to tune the workload to provide maximum performance. "Current CPU utilization. . .is well over 90%," Carpenter noted.

At the time he was making his report, Carpenter said "Data Analyzer runs now consume about 15% to 20% of CPU time charged to problem program state. This amounts to about 235 hour/mo, he added.

Univac Courts IBM DOS, DOS/VS Sites

BLUE BELL, Pa. – Univac has introduced a group of products designed to allow IBM 360 and 370 users to convert DOS and DOS/VS programs to run on Univac 90/60 and 90/70 hardware.

Although similar in concept to Software Design, Inc.'s recently announced VOS/360 [CW, March 15], which allows users to run unmodified DOS/VS software on 360 mainframes, Univac's products let the user move away from IBM mainframes altogether, the vendor said.

Designed to lure IBM users to Univac hardware, these conversion programs also appear to give existing 90/60 and 90/70 sites a means of using the wide range of software packages that have been produced for the IBM DOS, DOS/VS market, Univac said.

For a user who wants the 90/60 and 90/70 to emulate IBM's DOS environment, the DOS Mode of Operation (DOS Mode) software allows execution of batch programs directly under DOS without change, Univac claimed.

IBM DOS/VS users can facilitate conversion to Univac's Virtual Memory Operating System (VS/9) with two compilers and two translators, it said.

To convert DOS/VS ANS Cobol programs, one of the "translators" accepts DOS/VS ANS Cobol source statements and generates equivalent source statements acceptable to the VS/9 ANS Cobol compiler, Univac said.

DOS/VS Assembly source programs and user-written macros can be converted to the equivalent VS/9 source with the Assembly translator, which creates output in a form acceptable to the VS/9 Assembler or Macro Library Update routine, the vendor said.

Minor changes are required prior to Fortran recompilations, but any differences that may exist can be accommodated by the VS/9 virtual memory editor, Univac said.

Univac has made a source library transcriber available to transfer DOS/VS source, macro and Cobol libraries to VS/9 program files in a format acceptable to VS/9 program-preparation tools, it said.

Several features built into VS/9 simplify the transition to Series 90, the firm said. These include the virtual memory editor, Cobol program development subsystem and an interactive debugging aid.

All these products are free for Univac users. The firm can be reached through P.O. Box 500, Blue Bell, Pa. 19422.

NCR Adds On-Line Query Support

DAYTON, Ohio – The Management Access to Records (Matr II) software now available from NCR provides multiple-terminal on-line access and updating of files stored on 48K Century 101 or larger systems, the vendor said.

Using a simple conversational language, the software is capable of handling a variety of requests, NCR said. Record selection techniques include random, sequential and reverse sequential, and information requested can be displayed on CRT-based terminals like the NCR 796.

To implement the system, users identify data to be accessed with conventional Neat/3 file specification sheets, record and field definitions, he said.

Ready for immediate delivery, Matr II is subject to a one-time charge of $1,500 and an ongoing license fee of $40/mo.

NCR is headquartered at 17th and K St., Dayton, Ohio 45479.

$100 'Flecs' Extends Fortran To Include Control Structures

EUGENE, Ore. – An extension to "normal" Fortran and a transportable preprocessor for implementing the extension, the Fortran Language with Extended Control Structures (Flecs) package is available from the University of Oregon for a number of different mainframes.

The Flecs language contains nine control structures not found in conventional Fortran, which allows users to program more easily and naturally and to use structured programming techniques, the university said.

The preprocessor translates Flecs statements into conventional Fortran source code and produces formatted and indented listings which display the logical structure of the programs, the spokesman added.

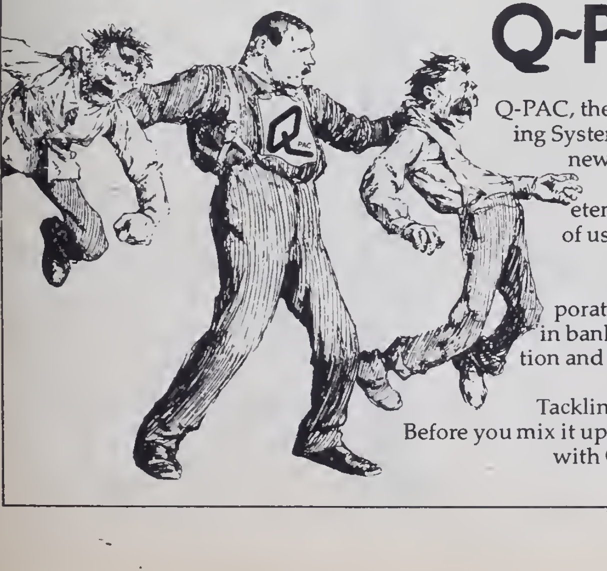
The Flecs preprocessor is a 2,000-statement program which is itself written in Flecs, plus several support subroutines.

Flecs can be used on IBM 360/370 equipment. In addition, the software is available for sites with Control Data Corp. Cyber and 6000/7000 series CPUs, Digital Equipment Corp. Decsystem-10s and PDP-11s and Xerox Corp. Sigma 5s and 6s, the university said.

Assembler language support of the subroutines is available for the DEC and IBM environments. On IBM systems, Flecs requires approximately 80K bytes of memory; on the Decsystem-10, 8K words are needed.

Flecs source code and installation, use and modification manuals are packaged for distribution from the university for $100.

Inquiries should be addressed to the Computing Center at the University of Oregon, Eugene, Ore. 97403.



Q~PAC~Mightiest Payroll System of All!

Q-PAC, the new Payroll, Personnel, and Labor Costing System from Software International is a brand-new approach to flexible, powerful, software. Based on a series of external parameters, Q-PAC handles an extraordinary range of user requirements by driving the programs *exactly* as the user desires. Installed in more than 200 major corporations around the world, Q-PAC is at home in banking, insurance, manufacturing, distribution and petroleum applications and it is available for Systems 360/370 in **DOS** or **O/S**. Tackling payroll and labor costing is a tough job. Before you mix it up with your present operation, get friendly with Q-PAC. It's great to have us on *your* side.

I'd like to get as much help as possible before I tackle payroll applications. Please send me more information on Q-PAC and your other hard-working Corporate Financial Systems.

☐ Q-PAC ☐ G/L ☐ A/P ☐ A/R

name ________ title ________ system ________
company ________ street ________
city ________ state ________ zip ________ phone ________

SOFTWARE INTERNATIONAL
Elm Square, Andover, Mass. 01810 (617) 475-5040
New York (914) 332-0040 Chicago (312) 729-7410 San Francisco (408) 371-0331
Los Angeles (213) 795-4256 Toronto (416) 862-0521 Philadelphia (302) 995-7101 Dallas (214) 233-5856

Structured Code Can Be Built—Even With Cobol

By Edward G. Nilges

Special to Computerworld

Concepts and Techniques

There are different views about using structured programming in Cobol. Edward Yourdon, in his book, *Techniques of Program Structure and Design*, wrote "While not as elegant and formal a language as Algol and PL/1, the Cobol language still includes enough features to make implementation of structured programs fairly practical."

On the other hand, Russell M. Armstrong wrote in *Modular Programming in Cobol* that "While Cobol programs can be written in a GO TO-less manner, it is impractical to attempt to revolutionize a few generations of Cobol users."

Cobol programmers code solutions to business problems. Since these solutions have deadlines, the extra investment needed to code around Cobol's limitations may be a waste of manpower. What may result is a program full of tricks whose purpose is to keep the program structured; these tricks can cause bugs in testing and irritate maintenance programmers unfamiliar with structured programming.

The only reason for using structured programming is clarity and maintainability. It should not reduce these program characteristics.

There are other objections to structured Cobol, beyond the ones usually raised. At least one major on-line system (CICS) requires programmers to use ALC-format macros to request services. These macros are converted by a preprocessor and the assembler into Cobol sentences (statements followed by a period). They cannot be embedded within IF statements, but must be conditionally executed using GO TO. This is unfortunate, since reliability is especially important in on-line systems.

Also, both Yourdon and Armstrong recommend PERFORM. . .UNTIL for all looping. In virtual storage systems, using PERFORM. . .UNTIL to execute a paragraph group which lies across a page boundary can cause page faults when changeable storage is in the same page as the PERFORMed paragraphs.

It is also questionable whether PERFORM. . .UNTIL increases clarity. Looping code is more readable when initialization, end testing, processing and incrementing are all on the same piece of paper. The various forms of PERFORM. . .UNTIL place processing on a different page.

However, there is a way in which the Cobol programmer can get the benefits of structured programming without its drawbacks.

Structured constructs in Algol and PL/I correspond in a simple, one-for-one manner with the translation done by an ordinary compiler. This machine language code contains GO TO statements unless it is the translation of process statements. For instance:

```
 IF condition
 THEN
   action1
  ELSE
   action2
  END IF
```

translates to

```
  If not condition go to action2
  action1 steps
  go to next step
  action2; action2 steps
  next step; . . .
```

While the object language translations of structured constructs are not structured in the syntactical sense, they have the same simple control structure and the modular one entry/one exit interfaces.

A structured program bears a closer relationship to its object form than it does to an equivalent source program written in an unstructured fashion; both the structured source program and the object program have the same flowchart, and that flowchart is structured. The object program is "virtually structured."

Virtually structured programming, used in a source language such as Cobol, imposes a good discipline on the use of GO TO. Used with a set of standards that make the virtual structures visible, it increases clarity and maintainability without forcing the programmer into trick programming. Finally, it is transparent to maintenance programmers unfamiliar with structured programming.

How would virtually structured Cobol programs be coded? Process statements would be coded as in a structured program. IF. . .THEN. . .ELSE constructs would be a mixture of IF statements wherever natural and simple and GO TO statements when the IF statements cannot be coded or are unnatural.

For example, in the following pseudocode, action3 must be performed after action1 and action2 if condition1 and condition2 are true.

```
IF condition1
THEN
  IF condition2
  THEN
    IF condition3
    THEN
      action1
    ELSE
      action2
    END IF
    action3
  ELSE
    action4
  END IF
ELSE
  action5
END IF
```

While this logic can be coded without using GO TO, by using redundant tests, it can more naturally and efficiently be coded using this virtually structured group of statements.

```
  IF NOT CONDITION-1
    GO TO ACTION-5.
  IF NOT CONDITION-2
    GO TO ACTION-4.
  IF CONDITION-3
  THEN
    statements to complete action1
  ELSE
    statements to complete action2.
  statements to complete action3.
  GO TO NEXT STEP.
ACTION-4.
  statements to complete action4.
  GO TO NEXT-STEP.
ACTION=S
  statements to complete action5.
NEXT STEP.
```

This virtually structured program piece removes the two outermost IFs from the nested IFs, but it has the same control structure as the original pseudocode. The GO TO statements go to the exit of the structure only.

This seems to be the cleanest way of implementing the logic shown; it perhaps could be improved in "formality" at the expense of naturalness by making NEXT-STEP a dummy paragraph name with no statements in its paragraph and also by inserting a dummy GO TO after the statements to complete action5.

Finally, note that structures of this sort can be modified in many cases to increase the level of conditional nesting without repunching each statement at different columns to show the new nesting level.

If a "condition0" was added to the logic shown above, such that if condition0 is true, the entire original structure does not have to be executed; all the program-

(Continued on Page 24)

The State of Wyoming

will be calling for bids to trade a 370/155 for a 370/155 with additional features or a 370/155 II (DAT). Please direct inquiries to Mr. Norm Lovelett, Administrator, Purchasing & Property Control, 2001 Capital Avenue, Emerson Building, Cheyenne, Wyoming 82002. Phone (307) 777-7253.

AKP
VOLUME
KEY PUNCHING
(402) 592-1686
"QUALITY
AT
LOWER
COST"
AMERICANA
KEY PUNCH
4345 South 89th St.
Omaha, Nebraska 68127

NOW
Extend your
3705
Emulator Program...
to front-end two CPU's
Our software and your IBM hardware combine to provide system select to either host as well as automatic switching of lines between hosts.
Ask about our complete selection of 3705 software.
COMM-PRO ASSOCIATES
638 14th St. • Manhattan Beach, Calif. 90266
(213) 376-1344

WITH DOCS
USE YOUR 3277 AS A DOS-DOS/VS CONSOLE!

DOCS – Display Operator Console Support – provides the IBM S/360 & S/370 DOS and DOS/VS user with 3277 display unit SYSLOG support. DOCS is simply installed on any DOS or DOS/VS system with no changes required by the user. All 1052, 3210 and 3215 typewriter functions are supported by DOCS with numerous enhancements over a non- DOCS environment.
DOCS is quickly and simply installed on any system. All that the user need do is catalog the DOCS distribution tape to his Core Image library, define where the DOCS hard copy file is to be located and execute DOCS. Total installation time required is under 10 minutes.
DOCS functions concurrently with EDOS, GRASP, DOS/RS, POWER II, ASAP, POWER/VS, and ITEL's DOS/VS executing on a S/360 and will enhance the system operation by providing improved facilities for the use of these packages while DOCS is controlling SYSLOG.
DOCS is available from C F S, Inc. as a licensed program product and may be leased monthly, yearly or on a one-time lease arrangement for $175.00, $1,890.00 and $5,670.00 respectively. All three lease plans include free maintenance for as long as DOCS is installed.

SPEED
DOCS provides significant through put improvement by the very nature of the speed of the 3277 display unit alone. Operators can even pre answer messages on the console.

MULTIPLE CONSOLES
DOCS allows from 1 to 16 3277 display unit consoles to be used simultaneously as SYSLOG devices

MULTIPLE OUTSTANDING REPLIES
DOCS permits messages followed by Reads to the typewriter to remain unanswered without tying up the system. All outstanding Reads are shown in high intensity on the display console (s)

REDUCED SUPERVISOR SIZE & OVERHEAD
DOCS does away with any need for the Console Buffering option in DOS or DOS/VS thus providing a savings in the core required by the users' supervisor as well as greatly reducing significant overhead to the entire system. Experience has shown that total through-put improvement with DOCS installed may approach 10% to 20%.

ELIMINATES DEPENDENCY ON TYPEWRITER
DOCS will continue to operate, and allow the entire system to operate, if the 1052, 3210 and 3215 typewriter becomes inoperable. DOCS spools all typewriter data to a hard copy disk file for later printing thus obviating the need for the typewriter to be on-line at all times. Hard copy is asynchronously provided if the 1052, 3210 and 3215 is available. A hard copy listing is also available through a utility program which the user may execute in any problem program partition to list the hard copy file on SYSLST.

NO USER PARTITION REQUIREMENT
DOCS executes in its own pseudo-partition thus allowing the user unrestricted use of the problem program partitions.

MULTIPLE EXTERNAL INTERRUPT KEYS
DOCS provides a separate External Interrupt key for each partition (replacing the use of the MSG command). This is especially convenient for EDOS users. This function is also useful for GRASP users when communicating with a Background partition problem program.

Send requests for DOCS to C F S. License agreements along with detailed information will be sent by return mail. Inquiries may be directed to:

Mr. Richard Goran
C F S, Inc., P.O. Box 662,Brookline,MA 02147
(617) 731-3474 Telex 94-0285

TSO for VS-1
Now Available
VS-1 has recently been enhanced to accommodate TSO. TONE is now available to VS-1 users (R3.0 up), to provide support for VS-2 R3.0 TSO. The system does not require TCAM, and does not swap users in control regions, thus boosting performance and reliability.
The package supports a wider variety of consoles than standard TSO, and is highlighted by enhanced 3270 formatting.
Twenty-four hour support. Installation available.
TONE SOFTWARE CORP.
P.O. Box 1127
Long Beach, Calif. 90801
(213) 433-0465

'Joli' Cuts Job Stream Disk Needed

NEW YORK – Providing procedure library support for IBM DOS and DOS/VS sites, Joli from Labyrinth Systems Ltd. is said to require only about 25% of the disk space used by IBM's own procedure library routine.

In addition, Joli allows for multiple private-procedure libraries and multiple '//JOB' cards in a cataloged job stream, neither of which is allowed in IBM's support, Labyrinth claimed.

In common with other procedure library packages, Joli virtually eliminates the use of cards and the problems inherent in that media in running jobs. All procedure decks are stored on disk – "any disk storage system," according to Labyrinth. Execution of programs stored in a Joli library will take place at disk speed.

Once stored in Joli libraries, jobs may be activated by a few cards that call in the Joli retrieval program and specify the desired job streams. The job streams themselves may include any stored card images including JCL, sort control cards, Power and Power/VS control cards and data cards.

The retrieval program permits temporary changes in the stored card deck at run time. A print program, also part of the Joli package, permits hard-copy documentation of what is stored in Joli libraries for more permanent maintenance work, Labyrinth noted.

No modification to the DOS or DOS/VS supervisor is required by the Joli logic, and therefore the package is not tied to any particular release of the IBM software, the vendor added.

The packaging can be acquired for $2,000 from Labyrinth at Suite 1500, 2 Penn Plaza, New York, N.Y. 10001.

DRS Version Planned for PDP-11

BALA CYNWYD, Pa. – A data base management, report generating and input system, DRS is being adapted by its developer – Aeronautical Research Associates of Princeton, N.J. (Arap) – for use on Digital Equipment Corp. PDP-11s under RSX-11M.

Scheduled for delivery this July, DRS-11 will be available exclusively from Sonco, Inc. based here, under a marketing agreement with Arap, a Sonco spokesman said.

Previously DRS has been installed on IBM 360 and 370 mainframes, as well as on IBM 1130s and Digital Scientific Corp. Meta-4 minis, emulating the 1130.

The versions are compatible with one another, according to one user who moved from the Meta-4 to a 370 last year.

DRS and, presumably, DRS-11 have several features that make them attractive to user organizations with non-DP-oriented users, Sonco added, citing a "very simple but powerful" reporting capability, the ability to handle "rapid" creation and retrieval of data bases.

The basic DRS-11 will cost $14,900, the vendor said, but a more typical packaging – including hierarchical and linked file support – will cost "about $30,000."

Sonco is at 211 Rock Hill Road, Bala Cynwyd, Pa. 19004.

Net Offers Pipeline Design Aid

DALLAS – Designed to help piping engineers with routine hydraulic calculations, Pipeline Design (PLDES) is available on the University Computing Co. (UCC) scientific and engineering services network, based largely on Univac 1108 systems.

PLDES is said to include features for line and orifice plate sizing and rating for liquids and gases, heat loss in insulated line calculations, flare/vent header design, flow network design and rating and water drainage system design.

The network is supported by offices in 30 U.S. cities and in 12 countries, according to sources at UCC headquarters, which can be reached through P.O. Box 6171, Dallas, Texas 75222.

Command Performance (And get it)

Read *Optimizing DP Operations through Software*, a special report in the April 26th *Computerworld*.

Edited by Don Leavitt, this supplement will contain helpful commentary, applications stories and tutorials on topics like these:

The scheduling of DP operations.
The use of independent packages which, for example, analyze how a program is operating and make the program work better without changing the logic or adding excess code.
Independent Sorts - several of which have been shown to be more effective than those offered by IBM.
Independent Operating Systems enchancements.
Software Monitors - programs which figure out what other programs are doing as they operate.
The use of Job Accounting as a means of controlling and optimizing DP usage - for example, instituting a charge-back procedure to using departments within a company for DP resources used.

If you're in the market for increased system performance at your installation, then you should be reading this special report in the April 26th *Computerworld*. And if you're marketing performance evaluation tools, you should advertise them here. Don't miss the April 9th closing date. Contact your *Computerworld* salesman for complete details. Or, call Judy Milford at (617) 965-5800.

COMPUTERWORLD

Boston
Bob Ziegel
Mike Burman
(617) 965-5800

New York
Don Fagan
Frank Gallo
(201) 461-2575

San Francisco
Bill Healey
Jim Richardson
(415) 495-0990

Los Angeles
Bill Healey
Jim Richardson
(213) 477-3535

GREATER PRODUCTIVITY BEGINS WITH KNOWING YOUR STAFF'S TECHNICAL CAPABILITIES.

Knowing the strengths and weaknesses of your staff can overcome almost any problem. SCOPE is an objective way to measure their knowledge.

A library of 50 scientifically designed tests, tailored to IBM 360/370, SCOPE covers • program languages • operating systems • debugging • systems analysis • design. Greater productivity begins with knowing your staff's technical capabilities...SCOPE is the first step. Find out how at a FREE SEMINAR. For more information call Bob Warburgh at (212) 486-7297. Or fill in the coupon.

I'd like to attend a FREE SCOPE SEMINAR
☐ Dallas March 25th
☐ Houston March 26th
☐ New York April 5th
☐ Washington, D.C. April 14th
☐ Chicago April 28th
☐ I can't attend, but I'd like more information on SCOPE.

Name
Company
Address
City
State Zip
Title
Phone

BCS BOEING COMPUTER SERVICES, INC.
P.O. Box 708, Dover, New Jersey 07801

Computer Security Institute announces two new workshops designed to protect your installation from fire, fraud and negligence.

1. Computer Security Risk Management

The objectives of this workshop are: 1) To convey the importance of risk evaluation and why it should be the first step in any computer security program. 2) To provide a thorough understanding of how to evaluate and classify risks, and quantify threat probabilities and loss exposures. 3) To provide a methodology for evaluating countermeasures on a cost benefit basis.

Threats & Vulnerabilities - Risk analysis begins by methodically isolating and quantifying potential DP loss exposures. For example, what would happen if your DP operations were disrupted for an hour, a day or a week? What would be the cost to replace your hardware, critical programs and data files? And how would the alteration or public disclosure of your proprietary data files affect your organization? Following the identification of these loss potentials, we'll evaluate the threats that could produce them, including natural disasters like fires, floods and earthquakes, or air conditioning failures. Plus the problem of unintentional human errors, and problems deliberately caused by unethical employees and outside perpetrators.

Probabilities of Occurrence & Annualized Loss Expectancies - The next step in quantifying DP risk is to establish a probability of occurrence for these threats. For some types of threats (fire, tornado and power outage), estimating the probability of occurrence can be relatively easy. For other types of threats it can be more difficult, as in the case of fraud and sabotage. You'll see how these probabilities are generated, and you'll be shown how to apply them. Determining an annualized loss expectancy is the final step in quantifying risk. It is the product of the potential dollar loss and the probability of occurrence.

Countermeasure Selection - We'll show you how the risk analysis output ties directly into the evaluation of various risk reducing alternatives. The cost effectiveness of a proposed security system or procedure can be determined by comparing the cost of the system to the annualized loss it is expected to reduce or eliminate. Rational decisions can now be made as to the appropriateness of physical and data access control systems, UPS, back-up air conditioning, fire protection and other preventive and remedial alternatives.

2. Physical Security & Disaster Recovery

The objectives of this workshop are: 1) To provide you with an overview of the nature and scope of physical security, vital records and disaster planning, and demonstrate how they relate to the overall computer security program. 2) To help you identify physical threats and evaluate the cost effectiveness of various protection mechanisms, including physical access control systems, fire detection and control systems, uninterruptible power systems (UPS), and water, temperature, humidity and dust control systems. 3) To develop a framework for disaster recovery planning to be used in designing and implementing your own program.

Physical Security - How it fits into the total program.
An overview of physical threats, including fire, flood, tornado, earthquake, vandalism, temperature, dust and humidity.
Analysis of protection principles: Threat removal and threat isolation.
How to conduct a vulnerability survey. . .and what to do with the results.
Facility construction and siting: selection, retrofit, architects, engineers.
Controlling access to sensitive areas: devices and techniques.
Fire prevention, detection and extinguishment.
The power problem: power company practices, transients, brownouts, blackouts.
How to determine requirements for protective equipment.
Water damage control: leakage, flood.
Vital records protection: how to identify and classify. Why quality assurance?
Protection techniques: on and off-site, on-line. Implementing a vital records program.

Disaster Recovery - and how it integrates with overall organizational plans.
Local police, civil defense.
Emergency response: the need for preparedness and immediate reaction.
Site selection, legal implications.
Backup operations - compatibility, task vs. time sensitivity.
Recovery: site preparation, EDP hardware supplies procurement.
Monitoring and testing the recovery plan: DP staff, security staff, key executives.

Computer Security Institute is a multi-service organization dedicated to providing DP users with information on how to safeguard their valuable EDP resources from damage or loss. Services include: a bi-monthly newsletter, research, a test program, computer security manual, buyers guide and seminars.

What's different about these workshops?

Workshop Counseling - Before and after each workshop, a Computer Security Institute instructor will consult with you via telephone. The aim is to help you identify problem areas in your own installation and at the same time encourage you to set specific objectives before attending. It's optional. . .an added "extra" offered at no additional cost.

Attendee Preparation and Research - Before each workshop we'll send you course materials and you'll be expected to familiarize yourself with it beforehand. We'll also ask you to check out your installation before the workshop begins, noting what problem areas require improvement.

Workathon - These accelerated two-day programs are designed for professional people who are willing to work and think hard. We've developed the "Workathon" environment to painstakingly explore the unique problems of each attendee and respond with practical information.

Small Workshops - Two workshop Leaders - Workshop attendance is strictly limited to 25 participants to maximize the opportunity for interchange between the workshop leaders and participants. Two Computer Security Institute faculty members will lead each workshop.

Special Interest Sessions - On the evening of the first day, we'll meet in small special interest groups. You should participate in these voluntary sessions because they'll focus on problem areas you've identified as important.

Awards - A rigorous examination concludes each computer security workshop. If you successfully complete this test and passing is not automatic you will receive a personalized Computer Security Institute citation in recognition of your achievement.

Here's what attendees have said about their experience at the latest Computer Security Institute sponsored program:

"Very professional, well organized with knowledgeable speakers. Even those I rate least valuable were good." P.E Swasey, Assistant Auditor, The First National Bank of Boston.

"The most professionally run conference I've ever attended."
David L. McGuire, Manager of Computer Operations, Skelly Oil Company, Tulsa, Oklahoma

"In spite of the criticisms offered, I learned many times more than I expected, this was a super experience Excellent quality of information, schedule outstanding."
First Lieutant Samuel T Marsh, U.S. Marine Corps.

You should Attend if you are responsible for any aspect of your company's computer security program. This includes DP Managers • Auditors • Risk Managers • Consultants • Security Officers • Systems Analysts • Facility Planners • Staff Accountants • General Management

Registration: The charge for each two-day workshop, including continental breakfasts and luncheons, comprehensive workbook and all course materials is $350 per registrant, payable in advance Computer Security Institute members are entitled to a special discount: the fee for "Unbundled" members is $295 per registrant, and the fee for Full Service members is $225. Hotel fees are not included in your tuition cost, but we have reserved a block of rooms at the workshop hotels, and many of these hotels offer preferential rates. A room reservation card will be included with the acknowledgement of your workshop registration. Remember, enrollment in each workshop is strictly limited to 25 participants on a first come basis.
Registrations cancelled up to 7 days in advance of the workshop will be refunded in full. Thereafter, if you cancel without sending someone in your place, a $50 service fee will be charged.

Workshop Faculty

Peter S. Browne, Workshop Chairman is Manager of Security Operation for the G.E. Information Services Business Division. Prior to joining G.E., he was responsible for the development of the computer security program at State Farm Mutual Auto Insurance Company. He has dealt with security of computer information as a staff officer in the Air Force. Mr. Browne is active in many national professional societies, was chairman of two ACM chapters and frequently speaks on the subject of computer security.

Belden Menkus has spent over twenty years helping management improve administrative systems and information handling techniques. He is Editor of the Computer Security Institute's *Computer Security* newsletter. He is a regular contributor to *Administrative Management* and an advisor to *Security Letter*.

Robert V. Jacobson is an Assistant Vice President of Chemical Bank where he is responsible for Information Systems Security. His experience includes computer simulations of weapons and radar systems at Raytheon Company. He later joined Bolt, Beranek and Newman, Inc. and served as General Manager of TELCOMP. He founded Bradford Associates, Inc., and specialized in computer security consulting.

Computer Security Institute
43 Boston Post Road
Northboro, Mass. 01532
(617) 393-3666

☐ I am a CSI Full Service Member
☐ I am a CSI "Unbundled" member
☐ Please send me free information on CSI membership

☐ Please register me for Computer Security Risk Management
☐ New York, April 20, 21
☐ Chicago, May 10, 11
☐ San Francisco, June 21, 22

☐ Please register me for Physical Security & Disaster Recovery
☐ Philadelphia, April 22, 23
☐ St Louis, May 12, 13
☐ Denver, June 23, 24

☐ I want to take advantage of the Pre & Post workshop phone counseling
☐ I do not want to take advantage of the Pre & Post workshop phone counseling
☐ I can't attend this time, but keep me posted on future workshops
Specifically, I'd like to see the following workshops offered ______

☐ I Enclose $350 per enrollment.
($295 for CSI "Unbundled" members, and $225 for CSI Full Service members)
☐ Check enclosed made payable to *Computer Security Institute*
☐ Company purchase order enclosed

Name ______ Title ______
Company ______ Phone (____) ______
Address ______
City ______ State ______ Zip ______

For additional enrollments, please copy this form.

Structured Code Can Be Built – Even With Cobol

(Continued from Page 18)

mer has to do to change the original Cobol program piece is add these statements before the first statement:

```
IF CONDITION-0
  GO TO NEXT-STEP.
```

A complex nested Cobol IF statement, even if possible, would have to be shifted to the right to show the new structure.

Because of the problems described already with the PERFORM. . .UNTIL statement, Cobol loops should in all cases be hand-coded in a disciplined manner. The DO WHILE structure should be coded as shown.

```
ANY-LOOP.
  IF NOT condition
    GO TO EXIT.
  loop body
  GO TO ANY-LOOP.
EXIT.
```

Unlike PERFORM. . .UNTIL, this set of statements can be easily modified to a structured DO UNTIL. DO UNTIL is structured construct that is not necessary to structured programming, but that is useful wherever a loop must always be performed at least once; in

```
DO UNTIL condition;
  action;
END DO
```

"action" is performed before "condition" is tested, and if "condition" is true, the loop terminates.

This logic can be coded in Cobol as follows:

```
ANY-LOOP.
  loop body
  IF NOT CONDITION
    GO TO ANY-LOOP.
EXIT.
```

There is a third DO structure which is reliable, modular and simple; it appears in Joel D. Aron's *The Program Development Process.* In:

```
WHILE condition1 DO;
  action;
 UNTIL condition2;
```

the loop body is repeated as long as condition1 is true and condition2 is false, and condition1 is tested before the action is executed, while condition2 is executed after the action.

Classically, a linear search has the above form. While full Cobol provides a SEARCH verb, many situations can be handled by Cobol structures of this form:

```
ANY-LOOP.
  IF NOT CONDITION-1
    GO TO EXIT.
  loop text
  IF NOT CONDITION-2
    GO TO ANY-LOOP.
EXIT.
```

Again, virtually structured Cobol can flexibly implement logic which PERFORM. . .UNTIL cannot.

The proper use of virtual structure requires discipline and professionalism. It is not the indiscriminate use of GO TO. But the essence of structured programming is not the syntax of a program, its textual appearance and lack of GO TO statements.

There have been efforts in automatically structuring unstructured code. If, as Yourdon pointed out, no technique can guarantee good programming style, this is a misbegotten effort.

Nilges is a part-time member of the Computer Science Department faculty at the College of Continuing Education, Roosevelt University, Chicago.

'DMMS' Eases CICS Mapping Chores

MILWAUKEE – The Display Map Maintenance System (DMMS) from Remote Data Systems, Inc. (RDS) was designed to simplify the use of IBM's Customer Information Control System (CICS) on 3270 or equivalent terminals, according to RDS.

Support for these devices is provided by the Basic Mapping Support (BMS) facilities of CICS, a spokesman for the independent acknowledged. However, he added, use of BMS requires development of logical and physical maps describing every field in input and output formats.

Maps normally are described by macro keyword parameter specifications, and map specification is a time-consuming and error-prone process, RDS said.

In contrast, DMMS provides the application programmer with the facilities to develop maps in their entirety by using a 3277 in an on-line environment, according to the vendor.

Specifying Format

With the RDS software, the programmer spends "a few minutes" specifying the format on the terminal. Then DMMS prepares jobstreams to assemble and catalog in appropriate libraries all the maps needed for on-line operations, the vendor explained.

Library and maintenance facilities will be provided to ease storage, retrieval and maintenance of all map formats, the spokesman added.

DMMS is available now for OS and OS/VS environments and should be ready shortly for DOS and DOS/VS shops. Cost of the current version is $2,800.

RDS is at 631 North Mayfair Road, Milwaukee, Wis. 53226.

An open letter to data communication executives who think they can't afford to upgrade to ICC modems.

Over the years, users of ICC modems have enjoyed special advantages. ICC protected them against price increases for periods up to 5 years with a choice of leases. They've been protected against unforeseen service charges by ICC's customer support policy. And, when they elected to use ICC modems, they were even willing to pay a little more for these advantages, and the extra assurance that their modems have been designed, built and tested to provide consistent service in the real world of transmission lines that behave differently from one day to the next.

When ICC customers upgrade their systems with higher speed and higher performance modems, they usually stay with ICC to fill their requirements, exchanging their modems for new ones. And, that's why today ICC can offer, at very reasonable prices, a selection of factory reconditioned modems. This is an unusual opportunity for users with a limited budget who need reliable high-speed data communication.

ICC's Special Offer Division now has available a selection of modems for operation at data rates of 2000 bps, 2400 bps, 3600 bps, 4800 bps, 7200 bps, and 9600 bps. These previously leased ICC modems have been completely reconditioned and tested at our manufacturing facility. They have passed ICC's quality assurance standards, and are covered by the new ICC customer support policy that eliminates most field service charges for the life of the lease, or for six months on purchased units. In some cases the quantities are very limited. In all cases the savings are very big.

While our quantities last, you have even more reason to add ICC quality and support to your data communication network. For complete information on reconditioned modems, call (305) 592-5722.

TYPICAL SAVINGS ON ICC MODEMS

PRODUCT		PURCHASE PRICE		MONTHLY LEASE RATES									
				60 MONTH		48 MONTH		30 MONTH		24 MONTH		12 MONTH	
MODEM	BPS	New	Reconditioned*	New	Reconditioned*	New	Reconditioned*	New	Reconditioned*	New	Reconditioned*	New	Reconditioned*
2200/24	2400	$1780.	$ 895.	—	$20.	—	$25.	—	$32.	$53.	$37.	$57.	$52.
4500/48	4800	$4980.	$1995.	$95.	$59.	$96.	$69.	$100.	$79.	$116.	$83.	$142.	$95.
4600/48	4800	$4750.	$1995.	$95.	$59.	$96.	$69.	$100.	$79.	$116.	$83.	$142.	$95.
4800/72	7200	$6900.	$2495.	$145.	$69.	$152.	$79.	$165.	$95.	$188.	$99.	$205.	$110.
5500/96	9600	$7990.	$3395.	$170.	$99.	$175.	$109.	$185.	$125.	$200.	$135.	$210.	$148.

Ask about Show Specials at the ICC booth at Interface '76.

ICC

Special Offer Division
International Communications Corporation
8600 N.W. 41st Street Miami, Florida 33166 Telephone 305+592-7654 TWX:810-848-6588

© 1976
*Available only through Special Offer Division

a milgo company

Memorex, Genesis One Units Show

Cost Savings Not Only Advantage of 3277 Equivalents

By Ronald A. Frank
Of the CW Staff

NEWTON, Mass. – Memorex Corp.'s introduction of a plug-compatible CRT to replace the IBM 3277 has emphasized the advantages of this approach to users.

The Memorex 1377 duplicates the functions of the IBM device and even adds a few features [CW, Feb. 23], but the on-the-surface selling point is an immediate price savings to the user.

Beyond the savings, however, there may be an even more important reason for a user to consider a 3277 plug-compatible device from an independent supplier. And Memorex is not the first – Genesis One Computer Corp. has had its G77 terminal available for some time.

The common approach used by both CRTs is that they operate behind the controller. In effect, the user unplugs his 3277 and plugs in the independent terminal without having to make any other modifications.

This contrasts with some other non-IBM suppliers that provide a complete terminal subsystem in which the user has to replace the terminals and the controller, which is IBM's 3271 (or 3272 for local mode).

The 3277 has an unusual amount of electronics, according to one terminal expert. IBM included such functions as keyboard control and cursor control within the unit, instead of allowing the controller to perform these tasks for the terminal cluster.

But the controller is still the important teleprocessing link to the user's network and, ultimately, to the host CPU and front end.

IBM's putting more than the usual capabilities into the terminal itself may indicate the 3271 is scheduled for an overhaul as IBM's Systems Network Architecture (SNA) becomes more clearly defined.

If that is the case, the user runs less risk of experiencing a major teleprocessing network upheaval if he installs independent terminals instead of an independent subsystem with an independent controller.

In the latter case, the user would be dependent on the independent supplier to provide a Synchronous Data Link Control (or any other) compatibility feature if IBM decides to make a major change to the controller.

IBM, of course, does not preannouce its future SNA plans. But there are indications this environment is in a state of change and perhaps even turmoil.

Just recently, IBM said its Telecommunications Access Method (Tcam) would now be able to interface directly with certain SNA-only terminals. This was surprising because a Tcam user previously had to implement the Virtual Telecommunications Access Method (Vtam) before he could operate with SNA terminals.

Analysis

Risk With Independents

There is some risk to the user in going with the independent terminals. IBM always has the option to modify the controller in such a way as to lock out the attachment of independent CRTs.

It is believed, however, the industry giant would hesitate to take such a step because it would presumably also mean modifications to the 3277. And there are a lot of the IBM terminals installed.

Whatever the unknown risks may be, the immediate savings are real. Genesis One spokesmen said their G77 costs about 30% less than a comparable IBM device. The 1,920-character version of the 3277 costs $139/mo from IBM while their replacement costs $100/mo.

Memorex spokesmen say the 1377 costs $110/mo on a two-year lease vs. $156/mo for the same IBM terminal. In addition, the Memorex 1377 adds a few features, the most significant probably being a line and column indicator on the 25th (normally unused) line at the bottom of the screen.

These indicators continually tell the operator the exact line and column position of the cursor. This is important when formatted information has to be entered into specific positions on the screen.

Versatile Unit

The 3277 is a versatile unit. It operates with 360/370 mainframes, the 3 and the 3790 terminal system. The IBM unit was designed and introduced several years ago.

One benefit for the independents is that they have been able to take advantage of more up-to-date technology in their plug-compatible CRTs. For the user, this translates into operating features such as a faster refresh rate which is said to reduce flicker.

Whether this newer technology also means higher reliability than the IBM terminals can provide remains to be seen.

In any case, users who now have the IBM 3277 may want to consider the plug-compatible units.

AT&T Files Plans to Offer Switched DDS

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – AT&T has filed plans with the Federal Communications Commission (FCC) to offer an interstate switched version of its Dataphone Digital Service (DDS).

To be called Dataphone Switched Digital Service (DSDS), the offering would provide two-way simultaneous transmission of digital signals at a synchronous speed of 56 kbit/sec and would be available on a two-point, station-to-station dial switching basis 24 hours per day for a minimum period of one month, AT&T told the FCC.

Customer stations on DSDS will be connected to a single common user switched digital net using switched digital access lines (SDAL). A connection between two stations on the network will be established by dialing a seven-digit code, AT&T said.

Users will be able to utilize a Bell-provided Switched Data Service Unit (SDSU) or a noncarrier equivalent. Three station arrangements will be available, according to AT&T.

The first arrangement, automatic answer-only, will receive all calls automatically, but will not include manual answer or call originating capabilities. The second, automatic originate and answer mode, will allow full automatic operation without any manual capabilities.

Automatic and manual originate and answer will be the third arrangement and provide the DSDS user with all operating options.

Rate elements included as part of DSDS include SDAL, a usage charge between digital network cities and the SDSU at the user's site for conditioning and controlling connections to the access lines.

Two types of SDALs will be available. Type 1 will cover locations reached with local-loop facilities near DSDS central offices. This will include a fixed monthly charge and a one-time installation fee.

Type 2 adds a monthly mileage charge to the Type 1 rates and was designed for users not located close to DSDS central offices, AT&T explained.

DSDS users will be allowed to let others use their service "to the extent permitted the customer."

An exception to this regulation applies to customers who provide value-added services to the resale of the DSDS, AT&T said.

The rates proposed for SDAL Type 1 were $275/mo while the Type 2 access line will cost $325/mo plus $6/mile/mo. Installation will be $150 for the access lines.

The SDSU automatic answer-only unit will cost $50/mo per station, while the automatic originate and answer will cost $70/mo per station.

The automatic and manual originate and answer unit will cost $85/mo per station under the proposed rates. Installation will be $25 for the service units.

DSDS mileage charges will be distance-sensitive with a scale ranging from .0065 cent/sec for the first 50 miles up to .02 cent/sec for distances over 2,000 miles.

It is expected that interested parties will have 30 days to respond to the FCC concerning the DSDS application.

Interface 76 Set

MIAMI BEACH "Data Communications – Liberation or Probation?" will be the topic of the keynote address at the Interface 76 conference and exhibition here next week.

Dan McGurk, president of the Computer Industry Association, will present the address. Other speakers scheduled to appear include Bernard Strassburg, former chief of the Federal Communications Commission's Common Carrier Bureau, and J. Roger Moody, vice-president of AT&T.

The conference will be held from March 29-31. Further information is available from Interface 76, 160 Speen St., Framingham, Mass. 01701.

CRT From WU Has Integrated Modem

MAHWAH, N.J. – A pedestal-mounted CRT terminal equipped with an integrated modem has been announced by Western Union (WU) Data Services Co.

Available as either a stand-alone unit or with the company's cassette buffer, the Video 100 is equipped with a Bell 103-type modem for various configurations at speeds up to 300 bit/sec.

The pedestal-mounted Video 100 with originate-only modem is offered on a one-year lease for $81/mo; with originate/answer modem, $86/mo; and originate/answer with automatic answering, $91/mo.

First customer deliveries are scheduled to begin in May from 70 McKee Drive, Mahwah, N.J. 07430.

Quality at low cost, the AJ 841

A lot of terminal users don't require the high speed and sophisticated versatility offered by many of today's computer terminals. And they don't need the higher prices either.

If your requirements are for a hard working, heavy duty terminal, and you don't need more than a 15 cps throughput, we have the answer. It's the AJ 841. You'll find it an ideal replacement for the IBM2741. Our new lower price makes it even more attractive. Fill in the coupon and let us send you all the details.

CW 76
Marketing Department, Anderson Jacobson, Inc.
1065 Morse Avenue, Sunnyvale, California 94086
Please send me more information on the AJ 841.

NAME__________
COMPANY__________
ADDRESS__________
CITY______ STATE______ ZIP______
TELEPHONE__________

ANDERSON JACOBSON
1065 Morse Avenue · Sunnyvale CA 94086 · (408) 734 4030

'Sonic' Net Links Vendor With Airlines Needing Parts

SEATTLE – Recognizing the need of its airline customers for better support in ordering spare parts, The Boeing Co. developed a communications network of remote terminals.

The Spares Ordering Nonstop Inventory Control (Sonic) system utilizes remote telecommunications terminals at customer sites tied to a Boeing computer system based here.

Sonic processes customer orders and inquiries as they are received and returns disposition status immediately.

The system design encompasses all the lines of business activity – manufacturing, material, pricing and parts storage, among others – that are necessary to maintain a complete picture of spares status, a spokesman said.

This functional information data base is continuously updated via remote telecommunications, he added.

Sonic receives parts orders, inquiries for order information and inquiries for stock status information from remote telecommunication terminals located in Boeing offices and at customer airline facilities.

If input is entered directly by the customer, the responding acceptance status message (or edit exception message, if the entry was incorrect) is transmitted back to the customer's terminal.

If the customer sends his order or inquiry to the Boeing Spares Department, a spares analyst will enter it into Sonic from one of the department's terminals.

Sonic has terminals operating from 15 char./sec to 4,800 bit/sec located at the airlines as well as various locations within Boeing, such as in the manufacturing, material and spares departments and the spares warehouse.

Terminal Transactions

Among the terminals used in the network are Data 100 Corp. and Datapoint Corp. 2200 CRTs and Memorex Corp. 1240 and 1250 communications terminals.

A Memorex 1270 communications controller with a capacity for 96 lines operates in a speed-recognizing capacity and allows the use of a variety of transmission speeds and codes.

The controller translates the Ascii-coded terminals to binary-coded decimal, used by Boeing's IBM 370 mainframes.

Both orders and inquiries are processed against the direct-access data base. Answers to inquiries are printed out immediately at the requesting terminal.

For orders, shipment is initiated automatically if the data base shows inventory is available in the spares warehouse.

If it shows otherwise, parts are automatically ordered from the manufacturing department or a vendor.

Sonic also tracks customer orders through the warehouse from the time the shipping requirement is produced until the order is shipped and invoiced. As parts are added to or removed from inventory, the system performs the related inventory management and accounting functions.

Modular Display Unit Replacing IBM 3270 Available From Trivex

COSTA MESA, Calif. – Trivex, Inc. has introduced a modular information display system which is said to be plug-to-plug compatible with IBM 3270 systems.

Each component in the Plus 70 system – display station, printer and remote and local controllers – has its own processor, Trivex said.

The components all operate under program control to emulate the corresponding component in the 3270, which is said to make the Plus 70 compatible with the 3270 at both the system and display/printer levels.

The Plus 70 display stations and printers can operate connected to either an IBM 3271 or 3272 controller or to a Trivex local or remote controller.

Two CRT display stations are available with either 480 or 1,920 characters displayed in a 7 by 9 dot matrix format. Five keyboard models are offered, including a 66-key typewriter, 66-key data entry unit, 78-key typewriter, 78-key operator console and an 80-key typewriter, the company said.

A Model 0722 local controller is available which is said to be interchangeable with an IBM 3272 controller and operates up to eight display stations and/or printers at data transfer rates of 10K- 650K char./sec, Trivex said.

A Model 0712 remote controller, interchangeable with an IBM 3271 control unit, operates in binary synchronous communications or in Synchronous Data Link Control (SDLC) over half- or full-duplex lines at speeds from 110- to 9,600 bit/sec, according to the company.

The controllers can operate up to 32 CRTs or printers with the addition of Model 0502 device adapters.

Two printers are available which include 80- and 165 char./sec print speeds in 7 by 9 dot matrix configuration- at 132 char./line.

The Model 0722 local controller is priced at $5,570; a Model 0712 remote controller for telephone lines costs $5,250; and the Model 0502 device adapter, which can be used to add eight devices as opposed to IBM's adapter which can accommodate only four, costs $700.

A display station with a 1,920-character screen is priced at $2,900. Prices for the different keyboards range from $315 to $595; and the 80 char./sec printer costs $5,150, while the 165 char./sec printer is priced at $6,450, he said.

Trivex can be reached at 3180 Redhill Ave., Costa Mesa, Calif. 92626.

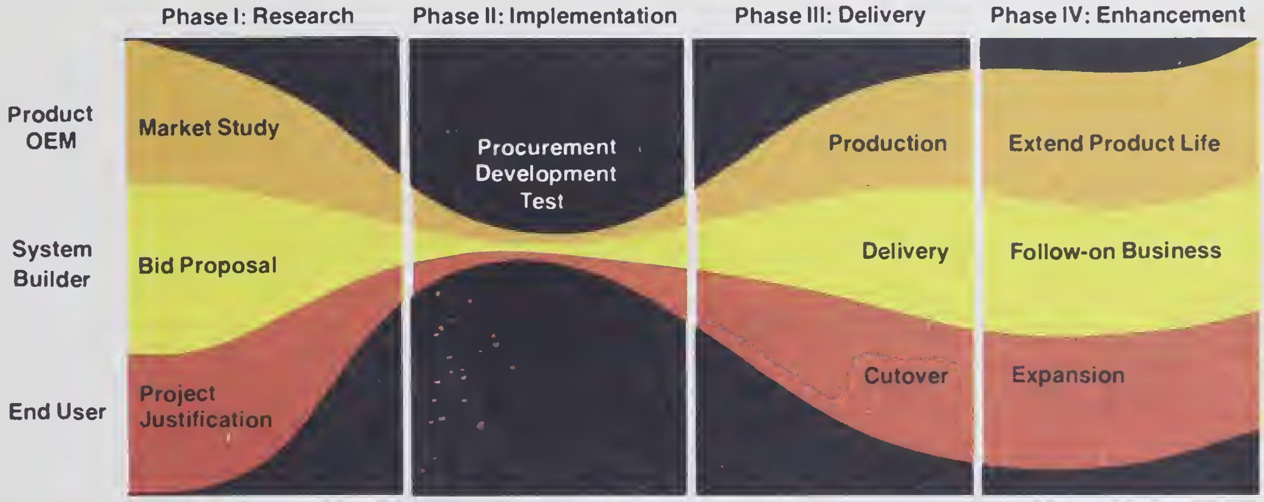
Paradyne Cuts Modem Prices

LARGO, Fla. – Paradyne Corp. is offering lowered prices on its digital large-scale integration (LSI) modems for a limited time.

Until May 13, the company will sell its LSI-96, a 9,600 bit/sec modem, and its M-96, a switch-selectable 4,800, 7,200- and 9,600 bit/sec modem, for $3,500 and $4,500 respectively.

Normal prices for these modems are $4,500 and $6,500 respectively, Paradyne said from 8550 Ulmerton Road, Largo, Fla. 33540.

MORE COMPUTER LIFE SUPPORT: PACKAGED SYSTEMS FROM INTERDATA



Interdata's computer products and services exist for one reason – to satisfy our customers: the Product OEM, the System Builder and the End User. Each of these computer buyers is involved with a Computer Life Cycle with four specific Phases – Research, Implementation, Delivery and Enhancement. Interdata responds to customer needs during each Phase with Computer Life Support.

IPAC/16 and IPAC/32: Today's computers for tomorrow's user.

Solve tomorrow's problems today with a packaged system from Interdata. IPAC/16 system includes a 16-bit Model 6/16 with 64KB memory. IPAC/32 has a 32-bit Model 7/32 with 128KB memory.

The IPAC system provides the Product OEM, System Builder and End User with a complete configuration of Interdata components for one low packaged price. IPAC is ready to use immediately for program development work in real-time process control, data communications, scientific research, or virtually every facet of data processing.

Today's IPAC includes an Interdata processor with memory and multi-tasking Operating System, 10MB Disc System, 400 CPM Card Reader, 200 LPM Line Printer, Carousel 30 Terminal. With free customer training, hardware installation and our full service warranty. Hardware and software to use in every phase of your Computer's Life Cycle.

IPAC/16, $33,500. IPAC/32, $43,500. Everything you need in a packaged system tomorrow...at a price you can afford today.

See Us at Computer Caravan 76

Send me more.
My Computer Application is ____________.
I want information on ☐ IPAC/16
☐ IPAC/32
My needs are: ☐ Immediate
☐ Six Months ☐ One Year
☐ For Reference Only

Name ____________ Title ____________

Company ____________

Address ____________

City ________ State ________ Zip ______

Telephone ____________

INTERDATA®
Interdata, Inc.
Subsidiary of PERKIN-ELMER
Oceanport, N.J. 07757
(201) 229-4040

Users Choosing Front Ends Advised to Consider Needs

By Ronald A. Frank
Of the CW Staff

WOBURN, Mass. – Front-end communications processors cannot be selected off-the-shelf, but must be chosen for their ability to meet a specific set of communications needs, according to Fred Bornstein, manager of administrative services for the consulting firm of Arthur Anderson.

Speaking at a Computer Caravan session here recently on front ends, Bornstein defined four basic types of front ends or communications processors. The first was the hard-wired transmission control unit, characterized by such devices as the IBM 2701.

These are "relatively inflexible" as far as changes in line speed, protocol and configuration are concerned, he said.

Next in capabilities, Bornstein described programmable controllers that effectively perform "software emulation of hard-wired transmission control units."

These devices have more flexibility to modify line speed and controller configuration through the use of software, he said, and also perform network reconfiguration and input message editing.

The third type of front end described by Bornstein was the file-based programmable controller which adds file validation, message switching and stand-alone operation capabilities.

The fourth type was the general-purpose minicomputer "that allows bit-oriented input and provides bit manipulation instructions. This minicomputer application does have some pitfalls, since the mini can be 'overloaded,' " he said.

In sophisticated large nets, the user might also consider a mainframe as a communications controller, but this would mean customized software and the need to handle and manipulate large files, he said.

On the average it will take the user three to six months to develop software and, in this type of system, a determination will have to be made of the impact on the host CPU's software, he noted.

Dealing With Vendors

Users should expect a small front-end supplier to have at least five comparable installations because nobody wants to be a pioneer, Bornstein said. He advised users to deal with "mature vendors," if there is any doubt about the viability of the company, he said, a financial statement should be requested.

In cases where the user does not want to deal directly with the vendors, it may be possible to let a consulting firm perform the screening function, Bornstein said.

Five type of vendors now supply communications front ends. These are mainframe vendors, independent companies which specialize in communications devices, mini makers that have adapted their units for communications applications and systems houses which include the communications front end as part of a completely configured turnkey system with software and hardware.

Two Function Categories

Communications control functions fall into two basic categories. The basic functions include line termination, transmission control, and channel interface capabilities. The advanced units add message control and applications processing, he said.

In basic devices, line termination includes establishing the link between the network and the controller, line scanning, line sampling, bit/character translation and monitoring functions, he said.

Transmission control deals with the operation of the network and error checking, execution of CPU commands and the blocking of transmitted characters, Bornstein said. And the channel interface provides a data path between the controller and the CPU.

The interface also converts data for compatibility with the data path and receives network commands from the CPU, he pointed out.

Advanced-Function Devices

In advanced-function front ends, line termination includes dynamic assignment of line interfaces, message scrambling and network diagnostics.

Transmission control adds automatic polling of remote devices, determination of terminal command sequences, message blocking and deblocking, internal processing, code translation and other off-loading of CPU functions to the front end, he said.

The channel interface can route messages to more than one CPU, balance workloads between similar processors and provide processor backup.

The advanced devices, such as the IBM 370X, add message control which includes network notification, message switching and reformatting and stand-alone operation.

These front ends also provide message queuing and logging, data validation, error display and correction and operating statistics, he said.

Technicon Has Micro-Based CRT For On-Line Health Facilities

MOUNTAIN VIEW, Calif. – Technicon Medical Information Systems Corp. has introduced a microprocessor-based CRT terminal which is said to operate in an on-line, real-time capacity.

The Model T-2201, an intelligent terminal designed for a hospital environment and for use by health care professionals, is plug- and function-compatible with the Model T-1201, which it replaces, Technicon said.

The terminal comes with a light pen that enables an operator to select or write medical orders and messages or review other information about patients, the company said.

A personal code typed on the keyboard allows entry into the terminal and permits an individual to see information only in his line of work, it added.

The microprocessor has 4K bytes each of random-access memory, read-only memory and programmable read-only memory, a spokesman said. Serial synchronous transmission at speeds up to 60 kbit/sec can be accomplished over hard-wired lines, he noted.

The terminal has an upper-case Ascii keyboard designed for clinical environments; the CRT display has a 7 by 9 dot matrix format, the spokesman said.

Technicon's system uses an IBM-type language to communicate with IBM 360/370 mainframes, although it can be used with other mainframes through application packages which are not supplied by Technicon, he said.

The T-2201 costs about $7,500 in quantities of 60, the vendor said from 590 E. Middlefield Road, Mountain View, Calif. 94043.

Data 100 Terminal Prints 125 Line/Min

MINNEAPOLIS – Data 100 Corp. has added a 125 line/min print capability to its terminal line.

The 132-column printer is said to be fully buffered and capable of producing forms of up to six parts.

It features a 64-character set mounted on a horizontal character-belt mechanism with individual characters that can be snapped on and off the belt, the company said.

As an option to the Keybatch system, the printer costs $8,145 or $222/mo on a one-year lease including maintenance. The Model 76-102 with the printer, a terminal control unit and a 150 card/min reader leases for $558/mo on a one-year lease with maintenance, according to the company at 6110 Blue Circle Drive, Minneapolis, Minn. 55435.

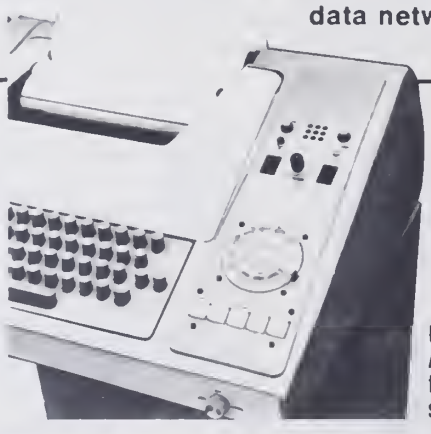
MI² CORPORATION

a prime supplier to the nation's major terminal leasing organizations,

presents:

TELEX REMOTE CONTROL UNITS
to interface
a Model 32 Teletype®
to the worldwide Telex
data network.

101C/TWX DATA SETS
to interface
a Model 33 Teletype®
to the widely used TWX
data network.



Each unit contains:

1 Operator's Control Panel with rotary dialers and necessary controls and indicators for mounting in a standard, low cost Teletype® and . . .

2 Electronic Package for mounting in the Teletype® pedestal.

All easily installed and ruggedly designed to assure long-term data transmission reliability.

Units Available from stock

When you want the best . . .

Write or call today!

MI² CORPORATION
1212 KINNEAR ROAD, COLUMBUS, OHIO 43212
TELEX 245359
(614) 481-8131

NCR
Data Processing Division — Wichita

NCR's Data Processing Division — Wichita has immediate openings for both junior and senior level engineers on Advanced Development and Product Development programs involving next generation minicomputer development.

NETWORK DESIGN ENGINEERS
• Node Control • Terminal Handling
• Computer Communications • Distributed File Management

DIGITAL DESIGN ENGINEERS
• I/O Controller Design

SYSTEMS DESIGN ENGINEERS
• Computing Systems Design • Special Systems Design

SYSTEMS SOFTWARE PROGRAMMERS
• Communications • File Management
• Minicomputer Operating Systems • Firmware Development

Get the details today. Send complete resume including salary history and requirements to Guy Carter, Professional Placement, Dept. CN, 3718 North Rock Road, Wichita, Kansas 67226.

An Equal Opportunity Employer

Bits & Pieces

Interface Links System With Card-Handling Device

HORSHAM, Pa. – An interface that permits the attachment of 80- or 96-column card-handling equipment to computer systems through the binary synchronous adapter is now available from Decision Data Computer Corp. here.

Any system with an EIA RS-232B or -C communications adapter is a candidate for the interface, the firm said.

The interface permits the company's equipment to attach a system's standard communications channel and to be driven by the system's communications software or equivalent electronics, the firm added.

The Local Communications Interface is available for Decision Data's Model 8010 Interpreting Data Recorder for 80 column cards; its 9610 Interpreting Data Recorder for 80 column cards; its 9610 Interpreting Data Recorder for 96 column cards; and its OEM Model 8035 and 8045 Reader/Punches for 80 column cards.

Monthly rental prices for data recorders with the interface, including maintenance, range from $245 to $295. Purchase prices are $8,350 for the 9610 and $8,450 for the 8010.

Model 8035 Reader Punch and the 8045 Printing Reader Punch, with the interface, are available for purchase only at $6,950 and $7,950 respectively.

Form Stackers Available

MOHAWK, N.Y. – Model 401 form stacker from Advanced Terminals, Inc. here is available in three heights compatible with a variety of line printers.

Available in 34-in., 37-in. and 44-in. heights, each model accepts all continuous fan-fold forms in widths from 4 in. to 18 in. and handles skip rates up to 80 in./sec.

The units stack froms onto a tray that lowers automatically as height of the stacked forms increases. A power roller pulls the forms outwards at optimum tension to prevent printer jamming, then downward through the upper part of the stacker.

The firm is at P.O. Box 80, Mohawk, N.Y. 13407.

NCR Announces Reader/Sorter

DAYTON, Ohio – A magnetic ink character recognition (Micr) reader/sorter has been announced by NCR.

The NCR 675-101 reader/sorter provides 25% greater document-sorting speed than the NCR 67- unit it replaces, the firm claimed.

The reader/sorter rents for $1,350/mo and sells for $58,000.

'Latest' Not Always Best

'Buy What's Needed,' Users Advised

By Toni Wiseman
Of the CW Staff

NEW YORK – "Don't buy what your salesman is pushing or what another installation has simply because it is the newest thing on the market. Buy what you really need."

That's the advice Gail Gomberg, director of DP for Abercrombie & Fitch, gave Computer Caravan attendees here recently.

Gomberg discussed the various aspects of equipment selection and financing alternatives, beginning from the point of deciding what kind of shop the user's application required – centralized, distributed, mixed, etc.

When deciding on the type and size of mainframe, the DP manager should think in terms of the volume of transactions that need to be processed, she said, warning that users should not be trapped into buying the biggest systems available simply because someone says it's the best.

"Memory is cheap – get enough," Gomberg said.

Virtual memory is a marketing phenomenon which results in vendors selling more peripherals and main storage, she said. Virtual can also slow the processing down if not used properly, she added.

Disks and tapes are both cheap, she noted, but a user should evaluate whether he really needs disks, particulary since tape is easier to program.

Disks may be necessary for on-line applications, Gomberg said, but a user should consider whether random access is really needed or whether all the files will be sequential.

Vendor selection is as important as equipment selection, she said.

The ideal approach is to present your requirements to the vendor and get price quotations. This will allow the user to compare "apples to apples" in order to determine which vendor can meet the requirements at the best prices, she said.

Price, service, performance and reliability are among the points which should be considered in selecting a vendor, she noted.

Questions to be asked include: Can you get 24-hour maintenance if you need it? What percentage of the vendor's business will your installation represent? Will he be relying on your programmers?

Client satisfaction is another important consideration, Gomberg said. "Don't be afraid to call other users to find out whether they are happy or not and, if not, why."

Finally, a user should decide whether he wants to be "the only kid on the block" with a particular machine or even the first person with a certain machine in his area, she said.

There are a number of methods of acquiring a computer system, Gomberg said. She advocated purchase or lease/purchase in most cases, especially in the case of mainframes. Peripherals however, might be better leased, she noted.

Investment tax credit and depreciation were two of the advantages she mentioned which the user can expect if he purchases his equipment.

If a user is unable to purchase, he can finance through the vendor. The interest rate may be high, but they will often take the risk, she said.

Prices from leasing companies are very competitive, Gomberg said. "Don't accept their first price; there are always points to negotiate," she said.

Transportion and conversion programming are two of the negotiating points.

"Obsolescence is a marketing phenomena," she concluded. "Is a 370/135 really better than two 360/40s? Don't get a fourth-generation machine because it's available, get it only if you need it."

Numeric 50 Char./Sec Wand, Updated 6-Font Unit Bow at KTC

SPOKANE, Wash. – The KT3 and KT9 optical character recognition (OCR) wands were introduced by Key Tronic Corp. (KTC) here recently.

The KT3 wand is designed to speed up numerical data entry operations, reading at up to 50 char./sec, the firm said.

The KT9 is an enhanced version of a previously announced product, a company spokesman said. It reads six different fonts, selectable by a group of pushbuttons on the back of the wand.

The KT3's character-reading electronic "camera" develops a train of electrical output as it moves across the printed or typed characters. The wand is linked to a box that contains the recognition circuitry, the firm said.

A fresh set of character signals from the wand's photocell array is fed into the recognition circuits for every 1/200 in. of wand travel, the firm said.

The recognition circuitry compare incoming wand signals with signal patterns that represent known characters and when a character is recognized, the circuit feeds out a digital signal in Ascii or other computer-compatible codes, KTC said.

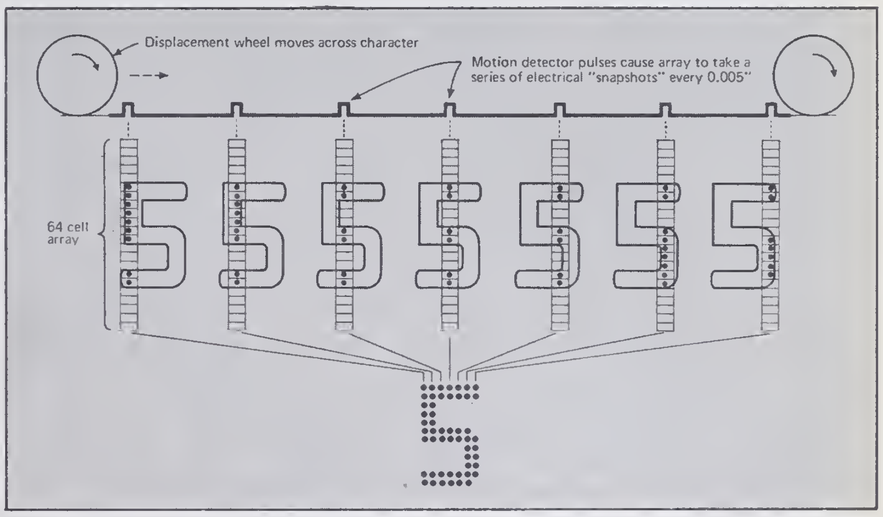
Data Read Manually

The data is read manually by moving the wand across the sheet or printed surface. The wand is placed in contact with the paper to permit a small motion-detection wheel on the underside of the wand to measure wand travel in 1/200-in. increments.

The system "beeps" if a character cannot be recognized because of poor print quality.

The wand and recognition logic handles numerals 0 to 9 in the OCR-A font adopted by Ansi in 1964, the firm said.

The KT3 wand plus recognition system is $3,250 in single-unit quantities while the KT9 starts at $9,000 from the firm at Building 14, Spokane Industrial Park, Spokane, Wash. 99216.


Displacement wheel moves across character
Motion detector pulses cause array to take a series of electrical "snapshots" every 0.005"
64 cell array

This illustration shows how the Key Tronic hand-held OCR system recognizes particular characters.

OCR

APPLICATIONS AT 50 CHARACTERS PER SECOND. JUST PLUG IT INTO YOUR SYSTEM. NEED WE SAY MORE?

key tronic
BLDG. 14, S.I.P., SPOKANE, WA 99216
USA (509) 928-8000 TWX 510 773-1885

PLEASE SEND DATAWAND LITERATURE TO ME AT NO OBLIGATION ON MY PART.

NAME ______ TITLE ______
COMPANY ______
ADDRESS ______
CITY ______ STATE ______ ZIP ______
APPLICATION ______ PHONE ______

☐ REFERENCE ONLY ☐ IMMEDIATE APPLICATION ☐ HAVE SALESMAN CALL

______
DATA ENTRY STATIONS VENDOR MODEL

INTERESTED IN ☐ ALPHA NUMERIC
☐ NUMERIC ☐ HAND PRINT ☐ OTHER
SPECIFIC FONTS ______
☐ TYPEWRITER ☐ PRINTER ☐ EMBOSSER

French Reservation System Averages 99.5% Uptime

By Ivan Berenyi

Special to Computerworld

PARIS – A massive reservation system for the French National Railways (SNCF) has completed its first 18 months of operation with an average uptime of 99.5%, according to Henri Dreyfus, management services director.

"This initial period has been, from the functional viewpoint, much more successful than anticipated," he said. "We found very little need for software modifications."

There are now 1,000 reservations terminals installed throughout France, about half of them in travel agencies and six in London.

The first 200 of these terminals are special-purpose machines designed for SNCF by IBM, but they have proved more of a hindrance than a help, Dreyfus said, adding he has now decided to standardize on Olivetti TC 355s.

"The IBM 4508 terminals are obsolescent by now," he explained, "and in any case IBM was not prepared to deliver small quantities – 20 or 50 terminals – when we needed them."

On the seat reservations side, SNCF has found – not entirely to its surprise – that the original 512K IBM 370/158s lacked sufficient capacity during a 60-day peak booking period, Dreyfus said.

A Model 168 has now been installed alongside the dual 158s and another will be added in April, after which the workload will gradually be transferred to the 168 multiprocessing system and the smaller machines phased out.

The seat reservations system is scheduled for reequipment in about 1981 or 1982, he said.

Standardization Impossible

Dreyfus, who once had ambitions to standardize SNCF's diversity of computer hardware, has philosophically accepted that for the time being this is a task beyond his powers.

"We still have all kinds of mainframes," he said. "IBM, Univac, Honeywell-Bull-CII, Burroughs, ICL. . .you name it, we have it.

"On reflection I have concluded that I don't mind diversity. It has, of course, many disadvantages in terms of compatibility, service, software interchangeability and so forth, but it also has advantages, and they are primarily political.

"We are buying a broader political base," he said.

Univac is probably the best-represented vendor in SNCF's 125-strong installation base in terms of value, with another 1110 system at the heart of its recently completed communications network, two 9480s used for personnel work in Marseilles and a 2405 for software development in Paris.

In terms of sheer numbers, though, Honeywell sweeps the board with no less than 86 H316s used as regional concentrators in the telecommunications network, he said.

Europeans Plan Net to Integrate Freight Systems

Special to Computerworld

PARIS – The Union Internationale des Chemins de Fer (UIC), which represents the major Western and Eastern European railway operators, is planning a $2 million data communications network to speed freight traffic between its 25 members and ultimately to integrate the various seat reservations systems.

Plans for this system have been drawn up by a four-man committee and are expected to be approved by the UIC at its next meeting.

Although the plans were developed by representatives from Germany, Britain, Belgium and Poland, the prime mover behind integration of European railway computer systems is the French National Railways (SNCF), whose management services director, Henri Dreyfus, is chairman of the UIC's computer committee.

"Initially the communications system will be oriented towards freight." Dreyfus said.

Linking the seat reservations systems via the same network will take somewhat longer. A generation gap has developed between systems like the Spanish RENFE's, the first seat reservation project in Europe started as long ago as 1965, and the more up-to-date systems like the Deutsche Bundesbahn's, the German system.

Hardware incompatibility adds to the problem, Dreyfus said. Siemens (RCA) mainframes are used by the German, Belgian, Dutch, Austrian, Italian, Swiss, Danish, Spanish, Czechoslovakian and Rumanian railways; IBM mainframes by the French and Swedes; and Honeywell CPUs by the Hungarians.

"It is very difficult to make the various systems in Europe 'speak to one another' now," Dreyfus said. "We will have to develop common messages and software standards, and this is probably not possible with the present generation of equipment.

THOMAS A EDISON (COLLECTION VIOLLET

TOMORROW IS NOT UNCERTAIN FOR CONFIDENT DECISION MAKERS

An intelligent Olivetti system insures the success of your decision

To grasp a situation, you need data. Data that is more reliable. Timelier. Clearer. Data processing conceived to fit the logic of your language and your style of management. You need an intelligent system to process and transmit the information vital to your business. A system capable of thinking and working like yourself. A system that can help you make decisions. A system that can sustain a daily dialogue with your accountant, your sales director, your inventory manager, your branch manager.

A4, A5, A6, A7, DE 525, TCV 270, TC 800, the complete line of new Olivetti systems. Systems for accounting and management, minicomputers, terminals, systems for collecting and transmitting data.

olivetti

Olivetti has installed all over the world 100000 teleprinters, 50000 terminals, 450000 business systems and microcomputers, and millions of typewriters and calculators.

For the full story, contact Olivetti Corporation of America - 500 Park Avenue - New York, N.Y. 10022

Give Independence From DPers

On-Line Systems Seen Impacting Bottom-Line Costs

By Esther Surden
Of the CW Staff

WOBURN, Mass. – On-line systems have the highest impact on bottom-line costs, John Morris, president of Morris Consulting, said at the Computer Caravan here recently.

The dedicated in-house computer takes two forms – on-line and off-line, Morris explained. In on-line systems, terminals are often CRTs disbursed to the people "who know the business"; the use of such terminals eliminates the middleman.

Off-line terminals run programs sequentially, while on-line programs work simultaneously, he said.

"The real bang for the buck is with the on-line system," Morris said.

Users should consider vendors other than the traditional large mainframe manufacturers when choosing an on-line system, he added, because the cost of hardware can be significantly less.

On-line systems "give the businessman independence from the professional DP person," Morris said. The user is the person running the business and working with the system, and this creates a smooth operation, he said.

Also eliminated are a number of jobs that add cost to running any business. These jobs are associated with activities such as data entry and compilation, he added.

The typical on-line system includes a CPU with 8K to 32K of memory, 5M- to 20M bytes of disk, a 100- to 300 line/min line printer and two to six CRT units. An operating system would also be included.

On-line systems might not be the answer for everyone, Morris cautioned. Businesses with low daily usage but complex monthly or quarterly activity might be better off using a service bureau, he said.

On-line systems are better for simple tasks with high daily usage, he added.

Sometimes a combination of a service bureau and a small in-house system can be the answer for the user who has a need for daily input and update and a monthly or quarterly need for other types of reports, he suggested.

To install a large in-house system to fill both functions would be a waste of money, Morris said; the system that could do both functions would be too cumbersome for the user's needs.

If a user has a monthly profile that shows nothing happens in his business until the end of the month, "I would tell him that if he wasn't happy with his service bureau to find another one," Morris said.

An on-line system pays back in repetitive situations, he added. "The payoff is in the optimized use of people.

"It's a bad situation when you have to change the business organization to fit the computer," Morris warned.

The use of on-line systems has its pitfalls, he added. "There are more failures with on-line systems, more interaction of variables. There are no reruns here" when everything is on-line, and information can get lost, he said.

With an outside time-sharing service, "if you fit into it, then it's a viable alternative," Morris said.

With time-sharing, however, the user relinquishes his flexibility. "The services have a limited amount of space so they have to restrict what the user can do with the systems," he said.

Central Control Urged For Distributed DP

By John P. Hebert
Of the CW Staff

WOBURN, Mass. – The aim of distributive processing is "to distribute the balance of the DP workload away from the CPU and to capture and manipulate source data as close to the origin as possible."

However, "it is necessary for central control of distributive processing applications," Don Waddell, project manager at the Foxboro Co., told attendees at the Computer Caravan here recently.

"The function of this central group will tend more toward coordination, guidance and implementation, leaving the operations of the system to the user," Waddell explained.

Foxboro's distributive processing includes source data entry, remote job entry (RJE), local stand-alone CPUs, data management packages, data collection, time-sharing and on-line systems.

In the area of data entry, Waddell noted, the international process control instrument company recently converted to a key-to-disk system which gives it the ability to do editing at the source.

This one move increased speed and efficiency about 15%, he said.

The RJE function at Foxboro consists of local stand-alone computers at two Massachusetts sites and three other sites in Canada, England and The Netherlands.

These systems include devices ranging from an IBM 1130 and Mohawk Data Sciences Corp. 2400 intelligent terminal to an IBM 370/125 and a Univac 90/30, Waddell noted.

RJE terminals are on the order of Data 100 Corp. Model 74 nonintelligent terminals. The company is contemplating Model 78 intelligent terminals made by the same manufacturer, however, so it can have the capability to do local processing at remote plants, he said.

One of the company's objectives is to centralize and control the processing of information. "In the future, there will be several applications which are conducive to handling by minicomputers," he noted.

In addition, tools such as data management packages are "helping to break out the workload from the DP department."

These tools have only one flaw, Waddell said, and that is a problem with data security: "We looked at 19 or 20 packages and none had any great amount of security built in."

Another problem area is a misuse of time-sharing, he noted. "We were paying a lot for disk space for an application which should have been done locally."

*"Sure, it's a solid-state, electronic world.
But 600,000 Teletype model 32 and model 33 units is one heckuva argument for an electromechanical terminal."*

The Teletype® model 33 is the standard of the industry because it delivers outstanding economy, reliability and versatility in a wide range of applications. From message communications to computer input/output. On switched network as well as private-line systems.

For more information about the model 33, write or call: Teletype Corporation, Dept. 32Z, 5555 Touhy Ave., Skokie, Ill. 60076. Phone 312/982-2000.

TELETYPE

Teletype is a trademark and service mark registered in the United States Patent and Trademark Office.

Peripheral vision.

CalComp looks at the future as if it were wrapped around the computer.

The computer remembers an incredible amount of data, but no matter how large its brain becomes it will always need help. It needs more "brain cells." Our memory systems provide that.

In the mind of the computer there are pictures. Man can see these pictures because we taught the computer to draw.
Today, CalComp is a world leader in the manufacturing of computer graphic equipment.

The information that spews out of the computer fills rooms with paper that is hard to retrieve. Our Computer Output Microfilm systems can reduce a roomful to a drawerful, and puts the information at your fingertips.

The information that is stored on computer tape is only as useful as the computer's access to that information. Our Automated Tape Library is the first system to give the computer automatic access to thousands of reels of tape—in seconds.

Our sales for fiscal 1975 were in excess of $120,000,000. And our backlog of orders at the beginning of fiscal 1976 was the largest in company history.

We've spent 17 years perfecting our peripheral vision.

Contact us for our view of the future. Write or call California Computer Products, Inc., CW M3 76 2411 West La Palma Avenue, Anaheim, California 92801. (714) 821-2011.

CALCOMP

Mini Bits

DG, DCC, Keronix Minis Get Disk Subsystem From EMM

SAN JOSE, Calif. – The EMM 1000 from Electronic Memories and Magnetics (EMM) is a disk subsystem for Data General Corp. (DG) Nova and Eclipse, Digital Computer Controls, Inc. DCC-116 and Keronix, Inc. minis.

The unit can either replace or be added to a floppy system, an EMM spokesman said.

The EMM 1000 has a 3M-byte capacity, movable head and fixed-disk drive coupled to a controller compatible with all DG and DG-emulating systems, the spokesman said.

The subsystem consists of an EMM/Caelus 103 disk drive and a DC-2000 controller. It is transparent to the RDOS operating system and compatible with the Iris software package, EMM said.

The drive is contained within a sealed, dustproof enclosure and does not require operator controls or adjustments, EMM said. The power supply is included.

The controller, contained on a single board that plugs into one slot in the mini, can control up to four drives.

Single unit price is $4,995 and OEM quantities are available from the firm at Dept. 1000, 1015 Timothy Drive, San Jose, Calif. 95133.

Pakomp II Works for Photofinishers

MINNEAPOLIS – The Pakomp II from Paco Corp. is a minicomputer-controlled system that prices, invoices and packages orders for the photofinishing industry.

The system can price and record for invoicing up to 1,000 rolls of film an hour and package them at a rate of 600 an hour, according to the vendor.

The Pakomp II is based on a Computer Automation, Inc. LSI-2/20 mini and ranges in cost from $35,000 to $100,000 depending on the capabilities chosen, Paco said from 6300 Olson Memorial Highway, Minneapolis, Minn. 55440.

GIS System Uses PDP-11

IRVINE, Calif. – The General Information Systems, Inc. (GIS) GIS-350 turnkey system is a dedicated accounting system based on a Digital Equipment Corp. PDP-11.

Using the firm's Able set of general ledger programs and The Accounting Language, the system generates a full range of reports, journals and ledgers in a single pass with a detailed audit trail

The system with the PDP-11 CPU, two 2.4M-byte cartridge disk drives, a CRT and line printer costs $45,000 including hardware, the firm said from Box 17388, Irvine, Calif. 92713.

Squeals on Hooky Players

Mini Gains $13,000 for School District

Special to Computerworld

LYNWOOD, Calif. – By effectively squealing on high-school hooky players here, a minicomputer-based attendance alert system gained $13,000 in five months for the Lynwood Unified School District.

"In a five-month test period with the attendance alert system, we reduced the loss of non-illness absence apportionment significantly," according to John Grady, director of pupil personnel for the district.

State tax funds are allotted to each district according to the number of students in attendance every day, Grady explained, adding full attendance means more money for the school system.

"A 32K IBM 3/10 was the backbone of the project. Clerks alone could not have done it – it was the three-hour turnaround and programmed message printout used by school personnel which cut into the monetary loss by returning students to instruction quicker," he said.

The mini was purchased originally for business applications and installed in the district's high school.

Developed by Grady as part of a doctoral project for Nova University in Florida and by Manny Zuniga, the district's DP center manager, the program tracks identified students using five "alert" stages implemented by school attendance and counseling personnel.

Various messages are printed on the absence list which the system generates for the high school. During the first alert stage – when a pupil has accumulated three consecutive absences – the message "Phone" is printed on the absence list opposite the student's name and absence record.

Using this list, a part-time attendance aide places evening phone calls.

"Some parents are really shook up," Grady said. "They usually did not know that their little Johnny or Susie had not been attending school.

"Calling in the evening between 5 p.m. and 8 p.m. catches most parents at the dinner table. Evidently, this contact has produced some interesting table conversation – we see most of the kids in the attendance line the next morning," he added.

Other alert stages are identified by messages which include "Five-Day Letter," "Parent Conference Request" and "Attendance Visitor Alert." These span a consecutive absence of five to 15 days.

Each message is implemented at the school level except for the requested at-

(Continued on Page 30)

Users Urged to Purchase Units, Obsolescence Called Vendor Ploy

By Esther Surden
Of the CW Staff

NEW YORK – "In my opinion, anyone who doesn't purchase a computer is crazy. Obsolescence is a marketing phenomenon," Leonard Farano, executive vice-president of Gambit Management Strategies, told a workshop on "Minicomputer Projections for the Near Future" at the Computer Caravan here last week.

There are several minicomputer myths that must be dispelled, according to Farano, and one is that minis are small, limited-capacity machines.

"What does 'small' mean?" he asked the group. "Some manufacturers offer them small, up to 1M bytes."

If the user believes the mini is a marketing phenomenon, then such a machine is a mini, he added.

Cycle time is another irrelevant term, Farano said. To the user who doesn't know about memory management or how much time it takes to access the material, the cycle time doesn't mean much, he said.

Throughput is a much more important consideration. "How much machine do I need to get my work done?" is the question, Farano said.

Another minicomputer myth is that there is less systems work required with a mini. "If you make the problem smaller, there will certainly be less systems work," he said, but that is not related to the fact the machine is a minicomputer.

Minicomputers are easier to program, Farano said. This, however, doesn't relate to their innate capacities.

"When we think of minicomputers, we think of on-line," so if a programmer can get into the source program and get instant test response, it will be easier to program, he said.

Everyone wants a mini, Farano said. "When you call a mini manufacturer, you're lucky if it answers the phone."

Everybody wants one because the user can constrain programming and personnel and the machine can be installed with a small number of people, he explained.

What is needed is a mini with unlimited core, a cheap mainframe, "fantastic" operating system and "perfect peripherals,"

(Continued on Page 31)

BTI Upgrades Interactive Units

SUNNYVALE, Calif. – Basic Timesharing, Inc. (BTI) has upgraded its turnkey systems designed for interactive timesharing applications with the introduction of three enhanced models.

The BTI models 4000/15, 4000/25 and 4000/35 replace the 4000/10, 4000/20 and 4000/30. Improvements have been made in CPU performance, on-line storage, software and system packaging, the firm said.

Microcode implementation of string arithmetic, logical operators and other operations previously performed by software is a system feature, BTI noted. Mass storage in the entry-level system has been tripled to 7.5M bytes and the cost of storage expansion has been reduced, the firm said.

Software backup and entry is provided via a magnetic tape pack unit, BTI said, and system communication has been enhanced with the addition of dual optional "polling" ports compatible with Bell 202C-type modems.

Protocol characteristics of the ports are user-programmable, a spokesman added.

All major system components are contained in stackable, interlocking cages, facilitating system repair by direct exchange of major system components, he noted.

The 4000/15 includes a CPU with 64K bytes of semiconductor memory, 7.5M bytes of nonremovable disk, software backup and entry via magnetic tape pack and eight ports for $35,950.

The system disk controller can accommodate up to three additional 7.5M-byte drives and the ports can be expanded to 32, the firm said.

The Model 4000/25 has 49M bytes of storage, backup, and eight ports for $56,300. The system can accommodate up to 32 ports and disk can be expanded in 49M-byte increments; software backup via disk pack is available in a two-drive system, BTI said.

The 4000/35 has 73M bytes of storage and costs $39,300. Storage is expandable in 73M-byte increments and port capacity to 32 ports.

The disk controller in the 4000/35 permits system clustering to form a multiprocessor system capable of accomodating up to 256 users, with more than 4G bytes of on-line storage, the firm said from 650 N. Mary Ave., Sunnyvale, Calif. 94086.

DOSSIER
An amazing new tool

Automate your next conversion.

Dossier automatically provides all the current program and file information you need to make any of the system changes listed. How? That's the amazing part. Dossier translates executable code from your core image library into completely accurate systems documentation. All with no user input, all for $780. It's not so amazing that more than seventy DOS and DOS/VS installations are using Dossier.

upgrade disk drives to 3344 and others

install a Data Base system

convert from DOS to OS

consolidate or rewrite application systems

plus...
other system changes requiring accurate and complete program and file information

Computer Concepts, Inc.
6443 S W Beaverton Highway
Portland, Oregon 97221/503-297-4721

Please send more information on DOSSIER.

NAME
COMPANY
ADDRESS
CITY
STATE ZIP
PHONE

Tabulates, Analyzes Costs

Agribusiness Uses Mini to Manage Farmland, Cattle

By Esther Surden
Of the CW Staff

STERLING, Colo. – An agricultural business here is using a minicomputer to keep crop records and analyze cattle costs.

The mini was installed in April 1974 after E.E. Sonnenberg and Sons, Inc. hired an accounting consultant to do a feasibility study on using a computer for the agricultural business.

The study, which cost the firm $7,000, recommended Sonnenberg hire an experienced DP person to determine which system was the best for the job and then implement it. The accounting firm helped with the hiring of the DP manager, a spokesman said.

When the DP manager was hired, he examined NCR Corp., Honeywell, Burroughs Corp. and IBM products and went out to visit several installations.

"There were no installations doing specifically what we had in mind," John Larson, Sonneberg's DP manager, said, and he realized he would have to write the specialized software.

"The choice came down to an IBM 3 or the Burroughs 1700 system," he recalled. The Burroughs system was chosen because it was more economical than the IBM system and because IBM recommended service from Denver, 120 miles away, while Burroughs had a local representative, Larson said.

Sonnenberg has a B1712 CPU with 32K of memory, a dual-cartridge disk drive with a total of 4.6M bytes of storage on-line, a 96-column card reader/punch and a 90 line/min printer.

The configuration, which cost the firm about $90,000, runs under the MCP operating system, according to Larson.

Some Bought, Some Written

The software for the general ledger, accounts payable and payroll applications was purchased from Burroughs and, Larson said, some of the firm's personnel were trained by him prior to the system's installation.

The general ledger was put on-line soon after the system was installed. He then began writing the specialized agricultural programs.

The company owns several thousand acres of land, farmed by tenant sharecroppers, and a way to keep track of the yield per acre was necessary. The program written for the system keeps track of how much corn each field yields, breaks the information down to bushels per acre and then tells where the product is stored.

The data is used to determine the payments to the farmers, Larson explained.

The largest program running on the mini is one that tabulates feed costs for cattle. Sonnenberg buys cattle at 500 lbs, pens them in close quarters and feeds them until they are fat enough to be sold for meat.

Various medicines, hay, protein and roughage feeds make up the food and the firm needs to know how much to subtract from inventory, the price of each ingredient and what the overhead is to feed the cattle, Larson said.

"When the last head of cattle is sold, we can see if we made a profit or loss on the transaction and if we are spending too much or too little on the feeding," he explained.

The firm plans to put a fertilizer use package on-line in the future.

The primary benefit of using the mini is that all the business' information is current, Larson said. "We are getting the information out sooner," he added.

Dicom Designs Floppy For HP 21XX Series

SUNNYVALE, Calif. – A floppy disk system designed to interface with Hewlett-Packard (HP) 21XX series of minis has been developed by Dicom Industries, Inc.

The HP421 includes a floppy disk controller, up to four disk drives and a HP 21XX-compatible software package.

Together with the 21XX mini, the system provides complete access to system/user programs, secondary storage management and an open-ended, modular operating system, Dicom said.

The HP421 has a data transfer rate of over 15 kword/sec with an average access time of less than .33 sec. Over 1M bytes can be stored on-line, Dicom said, and an additional .5M bytes can be added with three optional cassette drives.

The software package includes I/O drivers, a keyboard command processor, a software development package and Fortran, Dicom said.

The unit costs $4,900 from the firm at 715 N. Pastoria Ave., Sunnyvale, Calif. 94086.

Mini Gains $13,000 For School District

(Continued from Page 29)

tendance visitor alert, which is initiated automatically by the district office staff upon receiving a copy of the absence list.

Two Spinoffs

Two other reports are spinoffs Zuniga developed from the original alert program. One, an accumulative monthly recap of attendance of all pupils who have entered the alert system during the month, provides the district staff and the high school counselors with a means of identifying students developing attendance patterns which could interfere with their school progress.

The second report is a fiscal report generated from stored computer information. It is an accumulative monthly printout showing apportionment lost at the high school through non-illness absence and the value of that loss.

"At a glance, we can tell how much the district is losing and whether it is increasing or not," Grady said.

System Serves Purpose

By a CW Staff Writer

CUPERTINO, Calif. – A professor at the psychology department of a junior college here is using a minicomputer to perform a variety of functions including biofeedback experiments.

De Anza Community College purchased the mini to control lab experiments, teach students statistics and measure and control analog information. The mini is also being used to teach students Assembly language.

"Most students don't get a chance to learn real-time applications on big machines because they aren't set up for that," Frank C. Savage, professor of psychology, said.

Rats, pigeons, monkeys and humans are presented with a set of stimuli including light and sound; their responses are recorded by the mini, he explained. The experiments require the subject, for example, to discriminate between red and green lights; the mini perform
analysis of the response.

In the biofeedback experi
system collects information on
and plots the heart rate, ga
response, electroencephalogra
and temperature of each subje
a series of interfaces.

The college has a Hewle
Model 9603 data acquisitio
which includes a 21MX mini w
core, 5M bytes of disk sto
console, card reader, paper t
and five terminals, including th
Equipment Corp. Decwriters,
Instruments, Inc. 733 and one
minals and Communications mo

There are 144 lines going o
system and 36 lines coming
channel dual analog-to-digital c
also part of the system, whic
"excess of $50,000," Savage sai

The college chose the Hewle

TEXAS INSTRUMENTS HAS
SUPPORT, SOFTWARE AND HAR

The TI 990 computer family has all the ingredients.

The TI concept of what a computer family should be goes beyond producing the most reliable and cost-effective hardware around. To us, that's basic. The extra dimension is usability, and this means software and support.

The TI 990 computer family has all the ingredients. We make every member of the family ourselves, and we make them all software compatible from bottom to top.

Complete software libraries, as well as memory-resident and disc-based operating systems, support real-time and multi-tasking operations. We offer FORTRAN, COBOL and BASIC languages. Cross-support on timesharing networks allows early development of your own applications programs.

The TMS 9900 Microprocessor... The Technology Leader

The advanced capabilities of the 990 family result from a TI milestone in MOS technology...the TMS 9900 single-chip, 16-bit microprocessor. With its high-speed interrupt capability, hardware multiply-and-divide, and versatile instruction set, the TMS 9900 delivers the kind of computing power you'd expect from a 16-bit TTL computer. And it's the best microprocessor going for terminals, machine monitoring and control, and many other applications.

Because the TMS 9900 provides the instruction set for the new 990/4 microcomputer and 990/10 minicomputer, software developed for the low-end computers will be compatible with the higher performance models...and with a minimum of interface and software adaptation.

Versatile Operating Systems

The TX990 Executive Operating System Software uses either the 990/4 or 990/10 computer for low-cost multi-task control, requiring a minimum of peripheral support. The modular construction of TX990 allows users to select only the functions required for efficient memory usage, leaving more memory available for application software.

The 990/10 Disc System Software accents the mass-storage, random-access features of the disc with extensive file management and the multi-tasking features of the DX10 Operating System. The system software package includes a multi-pass 990 assembler, link editor, interactive source editor, and numerous other utilities that support easy implementation of application programs.

Flexible Packaged Systems

TI offers two packaged program development systems and a prototyping system for the user who needs his own stand-alone system for software and firmware development of application programs.

These packaged systems provide a flexible method of implementing early project development. These include the low-priced 990/4 Program Development System and the powerful 990/10 Program Development System. The 990/10 system combines the power of the 990/10 minicomputer with the disc-based DX10 operating system and an extensive set of software development tools. The standard package includes the 990/10 minicomputer with 64K bytes of error-correcting memory, ROM loader and diagnostics, 3.1-million byte removable disc kit with accompanying peripherals, and a complete software development package. And, at $24,500, this system costs at least 20% less than comparable equipment from other manufacturers.

For developing firmware modules, there is a $5950 prototyping system which includes a 990/4 computer with 16K bytes of memory and programmer's front panel, and a "Silent 700*" twin-cassette ASR data terminal. Also, an optional PROM programming kit is available for
developing read-only m
In addition, we provi
program development u
family. There is commu
that supports either syn
chronous data transmiss
with the TX990 or the D

Support from the start

We offer complete traini
assistance, plus a nation
backed by TI-CARE†, o
service dispatching and r
management informatio

For more information,
office or write Texas Ins
rated, P.O. Box 1444, M
784, Houston, Texas 770
Or, phone Computer
Equipment Marketing
at (512) 258-5121.

See the 990 Family at the Computer Cara

Arlington, Va. (703) 527-2800 • Atlanta, Ga. (404) 458-7791 • Boston, Ma (617) 890-7400 • Chicago, Il. (312) 671-0300 • Clark, NJ (20
Dallas, Tx (214) 238-5318 • Dayton, Oh. (513) 253-6128 • Denver, Co (303) 751-1780 • Detroit, Mi (313) 353-0830 • El Segundo, Ca. (213)
In. (317) 248-8555 • Milwaukee, Wi. (414) 475-1690 • Minneapolis, Mn. (612) 835-5711 • Mobile, Al. (205) 344-8082 • Philadelphia, Pa.
• Seattle, Wa (206) 455-1711 • St. Louis, Mo. (314) 569-0801 • Sunnyvale, Ca (408) 732-1840 • Winter Park, Fl. (305) 644 3535 • Amste
• Bruxelles, Belgium 733.96.24 • Cheshire, England 061-442-8448 • Copenhagen, Denmark 01/91 74 00 • Essen, Germany 0201/20916 • Fr
90-408 300 • Milan, Italy 02.688/8051 • Montreal, Canada (514) 341-5224 • Nice, France (93) 20 01 01 • Oslo, Norway 02-68 94 87 • P
Stockholm, Sweden 62 71 59/62 71 65 • Sydney, Australia 831-2555 • Tokyo, Japan (03) 402-6181 • Toronto, Canada (416) 889-7373 • Vanco

TEXAS INSTRUM
INCORPORATED

*Trademark of Texas Instruments

The Computer Caravan '76 is a whole year's worth of user forums

1ST DAY: MANAGEMENT OVERVIEW: Computerizing small organizations. Minicomputer projections. Developing Career Paths. Equipment and Financing Alternatives.

2ND DAY: SOFTWARE 76: Audit Software & Data Security. Data Base Management Packages. Software as a Measurement Tool. Packaged Applications.

3RD DAY: COMPUTER NETWORKS: Distributed Computing. Network Planning/On-Line Terminals and their Applications. Front-End Processors/Selection and Use.

product demonstrations

Full Exhibits program runs each day from 10-5, and will show you the latest products and services in areas like these: Data Acquisition and Controls. Data Capture Units. COM Units. Terminals. Modems. Couplers. Minicomputers. Miniperipherals. Teleprinters. Optical Scanning Systems. Performance Measurement Systems. Printers. Card Punches. Software Packages. Leasing Services. Storage Units and Memories. Key-to-Disk Systems. COM Units. Plotters. Multiplexers. Mag Tape and Disks. Timesharing Devices. . .and much more.

and exhibitor seminars

Each Caravan day. From 2PM to 5PM. Specific product information. Specific problem discussions. In-depth, first-hand information. Free to all Caravan Exposition ticketholders. Unique feature of Computer Caravan 76.

packed into 3 great days–and it's coming to a city near you!

FORUM REGISTRATION FORM

Advance registration is not required for attendance at the exhibits only.

Send to:
Registration Office
Computer Caravan 76
797 Washington Street
Newton, MA 02160
(617) 965-5800

Register me for ☐All three days ☐1st day ☐2nd day ☐3rd day.
(Copy this form to register additional people. When you register for three or more days -- for yourself or any number of individuals in any combination -- you get a $5 per day multiple registration discount.)

Name ________________ Title ________________

Company ________________

Street and Number ________________ City ________________

State ________________ Zip ________________ Telephone (________) ________________

Check City in which you plan to attend:
(your acknowledgement form will include complete details on times and locations)

☐ **WASHINGTON, D.C.** Mar. 16-18 Sheraton Park Hotel
☐ **ATLANTA** Mar. 23-25 Atlanta Merchandise Mart
☐ **DETROIT** Mar. 30-Apr. 1 Cobo Hall
☐ **CHICAGO*** Apr. 13-15 McCormick Place
☐ **DALLAS** Apr. 20-22 Market Hall
☐ **LOS ANGELES*** May 4-6 L.A. Convention Center
☐ **SAN FRANCISCO*** May 11-13 San Francisco Civic Auditorium

**Held in conjuction with CompDesign 76, the OEM Products show.*
You can attend exhibits and product seminars for both shows

Total Number of Days Registered on this form and any enclosed form:
______ If less than three, multiply by $35. If three or more, multiply by $30.

Total Due: $ ________
(Registration for any single forum day entitles you to attend all three days of exhibits. If you wish to attend exhibits only, no advance registration is required.)

☐Check Enclosed ☐Purchase Order Enclosed ☐Charge my American Express Card

COMPUTER
CARAVAN
76
Sponsored by COMPUTERWORLD

Cardholder Number
☐☐☐ ☐☐☐ ☐☐☐ ☐ ☐☐☐☐☐

Expiration Date ________________

Cardholder Signature ________________

Please circle one number in each category below.
(We must have this information to complete your registration.)

BUSINESS/INDUSTRY	
10	Manufacturer of Computer or DP Hardware/Peripherals
20	Manufacturer (other)
30	DP Service Bureau/Software/Planning/Consulting
40	Public Utility/Communication Systems/Transportation
50	Wholesale/Retail Trade
60	Finance/Insurance/Real Estate
70	Mining/Construction/Petroleum/Refining
75	Business Service (except DP)
80	Education/Medicine/Law
85	Government – Federal/State/Local
90	Printing/Publishing/Other Communication Service
95	Other
TITLE/OCCUPATION/FUNCTION	
11	President/Owner/Partner/General Manager
12	VP/Assistant VP
13	Treasurer/Controller/Finance Officer
21	Director/Manager of Operation/Planning/Administrative Service
22	Director/Manager/Supervisor DP
23	Systems Manager/Systems Analyst
31	Manager/Supervisor Programming
32	Programmer/Methods Analyst
41	Application Engineer
42	Other Engineering
51	Mfg Sales Representative
52	Other Sales/Marketing
60	Consultant
70	Lawyer/Accountant
80	Librarian/Educator/Student
90	Other

Whether you want to catch up or keep up, sign up now!

New York Sets Second Record!...

As it did in Boston, the snow flew on opening day of our New York Caravan, but the people came in anyway. More than 5400 people passed through the Registration Desk (A); a record 80% above 1975's New York attendance. The media were there too. Channel 5 was very interested in the computer in the home demonstration (D), while Channel 7 looks over a demonstration in the Software-ag booth (E). At Key Tronic's booth (J) Lyman Hill and Frank Lavery of Burlington, Mass. Savings Bank shake hands with Fred Zirkle after purchasing several DATAWAND hand-held OCR units. They had heard of the DATAWAND at the Boston Caravan, and flew to New York especially to make the purchase.

There was great interest in the Forums (I) and in the Exhibitor Seminars (H) in New York, as well as in the exhibits. Among the products and services on display were: Kennedy Company's new 9300 Magnetic Tape Transport-in the CompDesign section of the show (B); Houston Instrument's 2400 line-per-minute, $3,000 printer (C); AT&T's line of data communications products and services (F); Tandem's fail-safe "Non-Stop" computer (H); and Tally's line of medium speed dot matrix impact printers (G).

...Again it snowed and again Caravan attendance set a record. Thank you, New York, for your enthusiastic reception of Computer Caravan '76. Caravan this week is in...Atlanta.

See you there!

Exhibit Hours - 10A.M. - 5P.M.

ATLANTA	Mar. 23-25 Atlanta Merchandise Mart
DETROIT	Mar. 30-Apr. 1 Cobo Hall
CHICAGO	Apr. 13-15 McCormick Place
DALLAS	Apr. 20-22 Market Hall
LOS ANGELES	May 4-6 L.A. Convention Center
SAN FRANCISCO	May 11-13 San Francisco Civic Auditorium

COMPUTER CARAVAN 76

Sponsored by COMPUTERWORLD

Turnkey Presents Total Solution to Recognized Need

By Dan Knoppoff

Special to Computerworld

The term "turnkey" has come to describe any computer system available to a firm as a total solution to a recognized problem or need.

Turnkey systems are single-minded by nature and designed to accomplish a single task (or series of related tasks) well.

Supplied by numerous vendors, they come complete with necessary hardware (mini or microcomputer technology), software, documentation and training for both users and operators.

Typically, customers of turnkey systems don't care what computer supplies the power or how the software performs its series of tasks. What they want is a solution that works, that works as desired and that continues working as desired.

A doctor works from the symptoms a patient describes, performing tests, asking questions, making observations and doing analysis before stating an opinion on the problem. He does this even as the patient walks in and says, "Doctor, I have a sprained wrist."

Like the patient, the customer knows where the problem is located. This becomes a starting point. From there a vendor should gather the important information needed to state an opinion on the problem, including all inputs and outputs, input and output volumes, the flow through the current system and current controls in effect.

Typical firms have little or no DP personnel on staff. These firms can computerize via a fixed product at a fixed price. Precise definition of the firm's needs is absolutely necessary to arrive at a workable solution.

The turnkey system is at this point only a project workbook. Included with the definitions are the tasks necessary to prepare the solution. That solution is either a turnkey system from the shelf or a custom-designed turnkey system.

Even the most all-inclusive turnkey product needs alteration to fit the customer's needs exactly. To make sure the necessary alterations are found, a vendor should go through the definition as if he were going to produce a custom-designed turnkey system.

Building a turnkey system is like building a house. Small changes can be made to the interior: walls can be knocked down and moved and different color carpeting can be installed. Changes can be made to the exterior: siding or paint, window or no window, driveway or carport. All of the changes can be made with some grumbling, but little actual pain.

But additions, especially those to the middle of the house, are impossible, unless of course, the structure is bulldozed, and the building started again.

The customer must be made aware of factors which affect the turnkey system. Two of the most basic considerations affect both the present and the future, adding to the delivered application and the adding of new applications. Both can affect the hardware and the software.

Setting the direction at an early stage informs the customer that the system will work as desired and allows an identified product to be delivered.

The turnkey system is static, while the world continues to be dynamic. Changes must be considered before the first plug is plugged in. If the changes are not accounted for, the five-year life span of the system is cut to three.

The turnkey system is also single-minded. Once delivered it cannot be expected to be a processing panacea; plugged in it will not be an automatic overnight success, curing all ills. It will do the job it was planned to do and nothing more. Confusion over the delivered product must be stopped before it compounds itself.

Must Heed Growth

If the turnkey system were implemented with no heed of growth (either expected or unexpected), it may drown in a sea of new business.

Off-the-shelf turnkey systems may have graduated steps for implementation. Larger packages can be moved in when the purchased package becomes too small.

Growth in this manner is more costly than implementing the correct size package to start with because of implementation and added machine costs. Having this available is a definite plus for a package, as it is there as needed.

Custom-designed turnkey systems may have "hooks" designed into them to accommodate growth. When designed into the turnkey system from the start, rooms may indeed be added to the middle if necessary.

The numbers to estimate growth are supplied from the definition. Inputs and outputs previously identified, along with the expected growth rate, will determine necessary hardware and software requirements for the turnkey system to be implemented, as well as for the turnkey system in the future.

People can cause a turnkey system to fail more than any mechanical problem.

Operators should be educated to understand the mechanics of the hardware as well as those of the software. This enables an operator to monitor the turnkey system and identify and correct small problems as they occur. Larger problems are handled by the vendor's service staff.

User training must be planned and instituted so that the turnkey sytem is accepted and used correctly. Users generally have had no experience in dealing daily with a computer and sometimes resent the new system. The change to a turnkey system must not be considered a criticism of the way things were.

A turnkey vendor should provide its client with a series of justifications that include both performance and cost. Performance justification rates the old system with the turnkey system based upon expected volumes and estimated timings.

Cost justification rates the old system with the turnkey system based upon the cost to perform the various tasks, store information and retrieve information and on personnel costs within the various departments, etc.

It is here that the final go or no-go decision is made, based upon all of the findings and with the justifications presented.

The turnkey system to be implemented must be justified to do its job. It must do its job and nothing else. In this manner the solution justifies its own existence.

Knoppoff is a technical writer with Applied Digital Technology, Inc., a turnkey vendor.

DELTAK

Producers of the largest, most current, video-based training library in the world, presents sessions on *Strategies for Improving Personnel Productivity in a Tight Economy, Professional Development Training in a Data Processing Environment, Implementing Structured Programming in an EDP Organization, Structured Design and Its Impact on Structured Programming, The Future of the Computer Industry, DP Education and Training: Past, Present and Future, Distributive Processing, numerous concurrent sessions and DELTAK product demonstrations.*

INTERNATIONAL USERS CONFERENCE

APRIL 11-13, 1976 AT THE HYATT REGENCY CHICAGO

The Data Processing Industry . . .

Its Economics . . .
Its Expectations . . .
Its Education . . . . . .

FEATURING:

- **Larry Constantine**, expert and consultant on structured design.
- **Martha Lawlor**, DELTAK Manager of Education Services, and authority on the implementation of in-house DP training.
- **Patrick McGovern**, Chairman of IDC and Publisher of *COMPUTERWORLD.*
- **Chester Mills**, President of MSSI, Inc. and expert on DP marketing analysis, product requirements and planning.
- **E. A. Musselwhite**, Executive Vice President for DELTAK, and authority on professional development training.
- **Ken Orr**, Systems Director for Langston, Kitch and Associates, and past chairman of the Committee on Security and Confidentiality for the National Association of State Information Systems.
- **Donald E. Peeples**, Vice President for Operations, GTE Data Services, and authority on personnel productivity.
- **Edward Yourdon**, President of Yourdon, Inc. and expert on structured design and structured analysis.

CLOSING DATE FOR REGISTRATION: MARCH 30

DELTAK
O'HARE AEROSPACE CENTER
9950 W. LAWRENCE AVE SUITE 50
SCHILLER PARK ILLINOIS 60176
PHONE 312-671-5300
TELEX 28535

ATLANTA 404-394-9522 • BOSTON 617-266-5455 • CHICAGO 312-671-5300 • CINCINNATI 513-381-3279
CLEVELAND 216-292-4581 • DALLAS 214-233-3762 • DETROIT 313-557-2904 • HOUSTON 713-626-2302
LOS ANGELES 213-388-7173 • NEW YORK 212-575-0285 • PHILADELPHIA 215-928-1385 • PITTSBURGH 412-765-3539
SAN FRANCISCO 415-441-0919 • ST LOUIS 314-567-4247 • TAMPA 813-879-5877 • WASHINGTON D C 202-223-5533

DELTAK LTD.
CANADA
MONTREAL
PHONE 514-697-3105
TORONTO
PHONE 416-677-8100

BIS-Deltak Limited BIS
79-80 Blackfriars Road
London SE1 8 HB
Telephone 01-928-9511

CIM Deltak (Pty) Ltd
10th Floor National Board House
94 Pritchard Street
Johannesburg South Africa
Telephone 22-5381 2 3 4

BIS Deltak (Pty) Ltd BIS
Aetna Building 2 Help Street
Chatswood 2067
N S W Australia
Telephone 412-3266

Utvecklingsmetodik Deltak AB um
Djurklouvagen 11 161 38 Bromma Sweden
Tfn 08-80 13 68 08-80 14 46

CI Notes

IBM, VIP Settle Suits

ARMONK, N.Y. – IBM last month quietly settled out of court an antitrust suit brought by VIP Systems, Inc. The settlement terms were not disclosed.

The settlement covered both the suit brought by IBM against VIP for alleged nonpayment of $300,000 and the counterclaim by VIP.

In that action, VIP. charged IBM offered its text-editing services below cost and also deliberately provided faulty services to customers competing with IBM's Service Bureau Corp. from September 1969 to April 1970. VIP sought $40 million in compensatory and punitive damages.

VIP, formed in 1966, offered a text-editing service using a 360/40 leased from IBM. VIP sold its business to Bowne Time-Sharing in 1971, according to Joan Van Horn, president of VIP.

TRW to Maintain Singer Base

CLEVELAND – TRW Corp. has indicated it will assume managerial responsibilities on March 22 for the Singer Corp.'s base of System Tens and point-of-sale (POS) equipment.

TRW will provide maintenance and customer support, a spokesman said.

The firms are discussing the fine points on the contract, including whether TRW will assume any of Singer's lease paper on the systems and how many Singer employees it will hire, the spokesman added.

The move is seen by some as a means of increasing TRW's penetration into the POS arena.

DEC Licenses Norden

MAYNARD, Mass. – Digital Equipment Corp. has licensed the Norden Division of United Technologies to manufacture and market versions of DEC's PDP-11 minicomputers which meet military specifications.

Norden has already begun work on militarized versions of the PDP-11 and deliveries are expected to begin in 1977, according to Peter L. Scott, Norden president.

Supershorts

Digi-Data Corp. has named Potter Instrument Co. GmbH its exclusive distributor in West Germany, Austria, Great Britain and Ireland.

– – –

Microdata Corp. has signed Informatica Nacional SA in Mexico City, Mexico, as sole distributor of the Reality system in Mexico and Latin America.

Firms Think About Controlling Growth

By Molly Upton
Of the CW Staff

It could be 1973 all over again in 1976 – with one difference: Several West Coast firms recently indicated they are concerned with controlling their growth.

While several said the market for their products imposes no limitation on their business prospects, most of them added they are being circumspect in how rapidly they will grow.

"The market is by no means a constraint on our [add-on memory] business," according to Richard J. Egan, general manager of Intel Corp.'s Memory Systems Division.

In order to handle business in both this area and others, the firm has split off its memory business into one division and its microprocessor unit into another. Components and watches comprise other units within the company.

William H. Warren, director of product and business planning at Memorex Corp., said the market for that firm's double-density disk drive is so good the biggest problem is product availability.

At Hewlett-Packard Co. (HP), Ed Maccracken, general manager of the Data Systems Division, expects shipments of the HP 3000 to triple over those of last year.

In keeping with HP's philosophy of operating as a small company, the firm last year split off the 3000 and 2000 Access product lines into the Data Systems Division.

IMS Associates, Inc., which will soon begin shipments of its 108 intelligent disk, is experiencing good acceptance of its Imsai 8080 microcomputer system.

Ed Faber, a member of the marketing department, said being a private firm has advantages – specifically, it controls the rate of growth possible for the firm.

Shortages a Possibility

William F. Buster, vice-president of computer and communications systems at NCR Corp., said signs point to future materiel shortages. Shipments of NCR Centuries are up a little over those of a year ago, and he said he's beginning to see the change in the marketplace filter down to the manufacturing level.

Buster, who is also general manager of the Data Processing Division in San Diego, said he thought firms had learned a painful lesson about the hazards of hoarding inventory and doesn't expect to see much hoarding this year.

At International Computer Equipment Inc. (ICE), President Peter M. Barzo outlined expansion plans for this year, including splitting into separate companies its distributing, leasing and wholesale functions.

The firm, which is a national distributor for several lines of terminals, has offices on the West Coast and in Chicago and New York. It plans to expand into 22 cities with the aid of established representatives, he said.

But ICE is also working on getting close control of its inventory and correlating

(Continued on Page 36)

Two Firms Protest 'Auctioning' Of Bids by Federal Agencies

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – Two DP suppliers have filed protests with the General Accounting Office (GAO) against two government agencies for "auctioning" – which they charge it a violation of Federal government procurement rules.

In each case, the agency involved issued requests for proposals (RFPs), asked for "best and final" offers, in accordance with established government purchasing rules, and after looking over the bids, asked for best and final offers again.

In one case the supplier that would have won the contract on the first round lost as a result of the second request for its best and final offer.

In the other case, no contract has yet been awarded.

Computer Network Corp. (Comnet), a Washington, D.C.-based firm, filed a protest with GAO against the Federal Trade Commission (FTC) for auctioning.

The FTC requested bids for time-sharing services worth an estimated $100,000/mo for three years, mailed its RFPs to the vendors who requested them and received proposals from five service firms.

FTC then asked for best and final offers and the five responded. After reviewing the five offers, FTC wrote the bidders indications where their bids ranked in relation to those of the other bidders and invited them to make a second best and final bid.

Comnet was low after the first round, both technically and by price, according to Lee Johnson, Comnet president. Optimum Systems, Inc. bid lowest on the second and was awarded the contract.

Patently Unfair

The practice of auctioning is patently unfair, according to Terry Miller, president of Government Sales, Inc., a consulting firm here.

RFPs are by regulation supposed to be secret, negotiable and fair. Auctioning allows an agency to solicit bids and then make value judgments on the bidders, Miller said.

Because Johnson said he has little hope that the GAO will take any action before the contract is up, Comnet has filed a lawsuit against the Federal Trade Commission.

Sycor, Inc., based in Ann Arbor, Mich., filed a protest with GAO against the Defense Supply Agency (DSA) which had asked for bids on a contract for approximately 1,500 terminals, worth an estimated $8 million over the next several years.

DSA requested best and final offers in July and mulled over bids received from Sanders, Incoterm, and Computer Optics as well as Sycor.

Then in December, DSA requested best and final offers again. Both Incoterm and Sanders lowered their prices when given the chance. Sycor did not.

DSA cited as its reason for a second best and final the 3% drop in the prime interest rate between the time the bids were first requesetd and the time the contract was to have been awarded.

GSA Nixes IBM-DOD Contract

WASHINGTON, D.C. – The General Services Administration (GSA) has turned down the Department of Defense's (DOD) request for an indefinite quantity contract with IBM for computer acquisition, saying such a contract was not justified.

Rep. Jack Brooks (D-Texas), chairman of the House Government Operations Committee, was against the proposal because, he said, it would set a bad precedent – one that might encourage every agency to seek its own indefinite quantity contract with IBM.

Such a move would create waste and duplication, a situation Congress tried to avoid by passing the Brooks Bill several years ago, he said.

The indefinite quantity contract would have effectively given the DOD an exclusive schedule contract at early 1975 prices – about 8% below IBM's present rates.

Under the current partial schedule with IBM that cover only equipment installed at the beginning of the fiscal year, federal agencies have to seek competitive bids for their computer acquisitions.

The partial schedule was developed after IBM failed to submit its proposal by GSA's deadline of Feb. 28, 1975.

If It's New in Data Processing,
You'll Find It In Advanced Systems Curriculum.

NEW COMPUTER TECHNOLOGY VIDEO UPDATE SERIES

In this series, produced in cooperation with Auerbach Publishers, We offer a succession of reports presenting the latest "State of the Art" developments in computer technology. The first two updates already available are:

SYSTEMS NETWORK ARCHITECTURE AND SDLC
This video update concentrates not only on the features, advantages and disadvantages of SNA and SDLC, but more importantly upon their real cost and long term implications.

FINE TUNING VS FOR EFFICIENCY
This video update examines why VS users are experiencing a dramatic degradation in system efficiency and job through-put. The solution offered may not be to your liking and may be considered controversial.

ASI
ADVANCED SYSTEMS, INC.
1601 Tonne Road
Elk Grove Village, Illinois 60007
Phone (800) 323-0377
Illinois residents call collect:
(312) 593-0377

In a fast-moving industry like data processing, the only way to keep up is to move ahead.

As the world's leading educator in data processing, we already offer over ***750*** *video-assisted courses in 11 fields of study. And we'll keep adding more.*

So look for our new courses here each month.

Our job is to keep you Advanced.

Adapso Revamps Position on Incremental Marketing

By a CW Staff Writer

MONTVALE, N.J. – "Except and to the extent justified by the economics of scale, competition with respect to each product line or 'market' of computer services should to the maximum extent be kept independent of economic forces external to such line or market," the Association of Data Processing Service Organizations (Adapso) said in its latest position paper on incremental marketing.

"Independence should be assured by application of the doctrine of maximum separation which requires, to the extent appropriate, that there be separate facilities, separate personnel, separate name and whatever other separation is necessary to prevent the spillover of economic power from one separate line of commerce to another," the Adapso paper said.

The paper is seen as part of Adapso's continuing battle against competition from organizations that can use other business areas to underwrite costs of offering DP services. Adapso labeled such firms "cross-market operators" which have the ability to price services on an incremental cost basis.

Adapso is therefore advocating extending the policy of maximum separation, as expressed in its testimony before Congress on bank holding companies [CW, March 15], to other lines of business.

Services Bigger Than Hardware

The computer services industry probably would be larger than the hardware industry if all computer services were separately identified and "broken out" from hardware operations, according to Adapso.

Although the services industry is burgeoning – already operating at the multibillion dollar level – and competition is "substantial and effective," the "dangers of impairing that competition are also substantial," the paper stated.

The DP services vendor is at a comparative disadvantage, Adapso said, because at inception of operations, the firm has only a single product line over which to spread its fixed costs.

"It does not possess a ready and relatively 'captive' market or the marketing leverage resulting from the cross-market relationship to cover its break-even costs," the association said.

In addition, in certain types of offerings, such as time-sharing services, the new enterprise must recoup huge startup costs. "Potentially large profits are needed to offset the inherent risks and attract capital," the paper continued.

In order to counter this perceived adverse competitive impact, the computer services industry has been seeking to isolate the competition in what it considers to be its separate markets from external market advantages, the association said.

Adapso cited its efforts in banking, communications carriers, tax-sheltered organizations, accountants, conglomerates and electronic funds transfer systems (EFTS), which it called "the most recent and certainly now the most important part of the struggle."

Adapso Sets Meeting On 'Quiet' Revolution

ATLANTA – The "quiet" revolution taking place on a variety of fronts in DP will be addressed at the Association of Data Processing Service Organizations' (Adapso) 44th Management Conference April 5-7 at the Fairmont Colony Square Hotel here.

The conference program will be aimed at "key industry managers with 'bottom-line' responsibility," Adapso said.

General sessions of broad appeal will be coupled with concurrent workshops designed to meet the needs of those in Adapso's Software Industry Association, Data Center Section and Remote Processing Services Section, the organization said.

"The Constants of Change" will be discussed in a luncheon speech by F.G. (Buck) Rogers, vice-president of marketing at IBM.

Afternoon workshops will be given on "Using COM, Microfiche and Microfilm – A New Profit Center"; "Using Intelligent Terminals in the Data Center Environment"; and "The Service Firm Going Remote."

In addition, a session on "System 32 – What Is It?" will be led by David Dietzen, planning manager for the System 32 at IBM.

On Tuesday a panel of four software product companies' chief executives will discuss "Protecting Your Products From Theft and Disclosure."

Sessions will also focus on software user groups and buying and/or selling software.

Wednesday sessions will open with a discussion of the development of information policy by Quincy Rodgers, executive director of the Domestic Council Committee on the Right of Privacy.

"Privacy and Security in the Data Processing Industry – A View From Adapso" will be given by Stephen Beach, chairman of Adapso's Committee on Privacy and Security.

Further information on the conference is available from Adapso at 210 Summit Ave., Montvale, N.J. 07645.

Firms Express Need To Control Growth

(Continued from Page 35)

that with order forecasts, he said.

Tri-Data Corp., whose initial product was the Cartrifile, expected to continue spending R&D funds during 1975 so it would be in a decent position once the market picked up, according to its president, Lawrence Weiland.

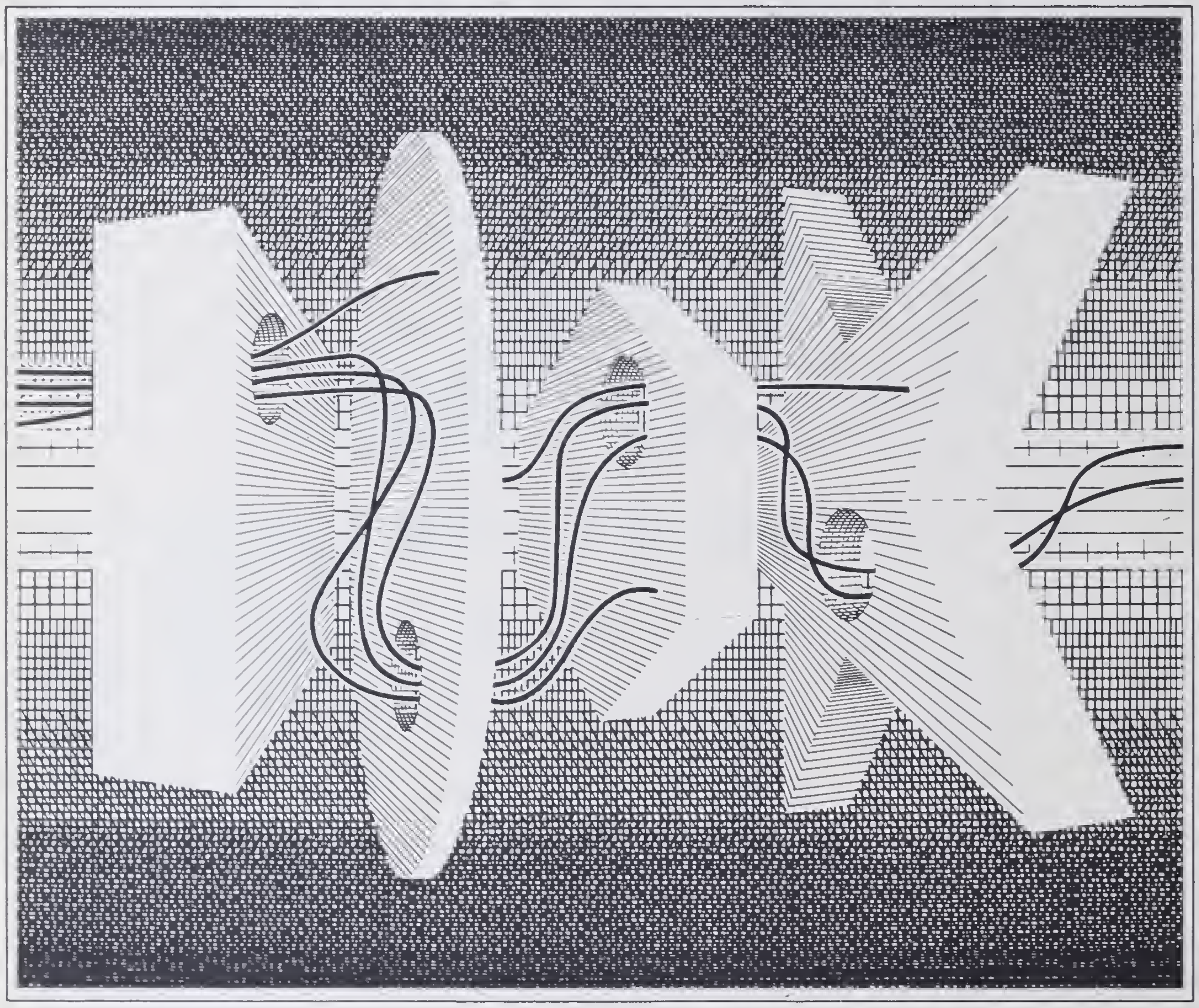
Tri-Data continued funding work on a new business it had bought in 1974, Data Recognition, which makes an Automatic Data Entry System (Ades), a high-volume document processor. It also developed the Flexifile floppy disk system.

Weiland attributed the firm's ability to survive and grow on a controlled basis to its philosophy of avoiding being a "me-too" firm by assuring each product is unique to the company.

The firm was founded nine years ago on $1 million and "has never gone back to the well" for more funds, he said.

Jim Treybig of Tandem Computers, Inc. said his firm could get more financing from its backers, but it doesn't want to dilute the profit potential for these firms.

Now, they're calling us "relational."



Why?

Because INQUIRE® has a solution to a mushrooming problem: increasingly complex data structures.

INQUIRE lets the user and designer build logical views of data structure and physical views of data storage. Hierarchies, networks, or flat files (we call them multiple group items) are selected, evolve and are fine-tuned through INQUIRE's integrated capabilities.

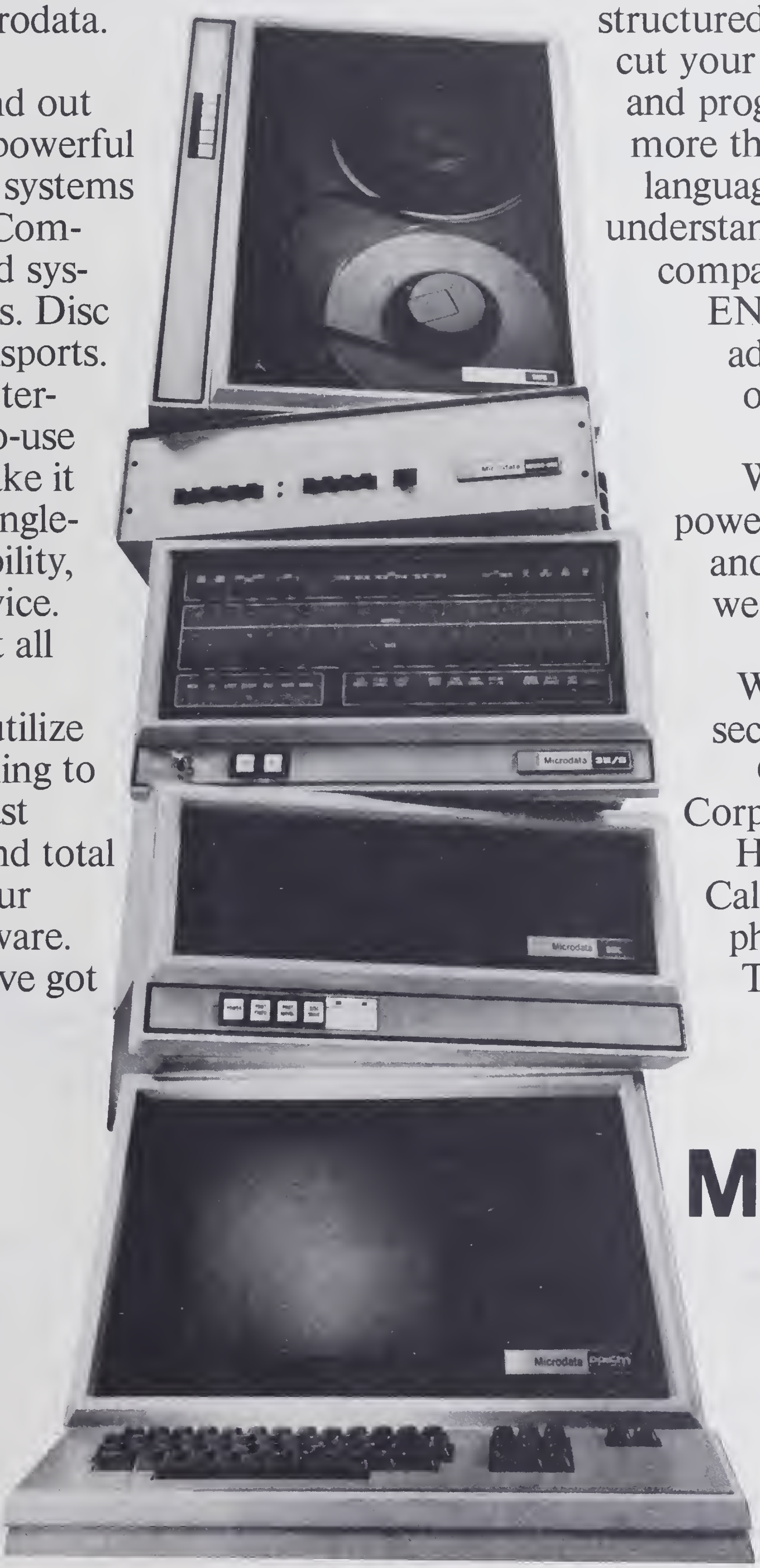
Shouldn't we discuss the "relational" pay-off of your investment in information? Telephone 703-578-3430 or write INQUIRE.
Infodata Systems Inc.
5205 Leesburg Pike,
Falls Church, Virginia 22041.

INQUIRE means business.

INQUIRE®
Infodata Systems

©COPYRIGHT 1976 ®INQUIRE REGISTERED U.S. PATENT OFFICE TO INFODATA SYSTEMS INC., ROCHESTER, NEW YORK, U.S.A. COVERED BY U.S. PATENT NUMBER 3670310

You can make it in the OEM systems business in 7½ seconds.



It takes only 2½ seconds if you have a push-button telephone. Because all you really have to know is the phone number for Microdata.

714/540-6730.

Call us and find out about the most powerful OEM computer systems on the market. Completely integrated systems. Computers. Disc drives. Tape transports. PRISM™ display terminals. Ready-to-use software. We make it all. So you get single-source responsibility, support and service.

And that's not all you get.

Our systems utilize microprogramming to give you superfast response time and total protection of your proprietary software. It helps that we've got more experience in microprogramming than any other company in the world.

And our systems use a high-level block-structured language that can cut your coding, debugging and programming costs by more than half. Computer language is something we understand – we're the same company that developed ENGLISH™, the most advanced multi-user operating system in existence.

With our line-up of powerful OEM systems and in-depth support, we think we can help you make it.

Why not take a few seconds and find out. Contact Microdata Corporation, 17481 Red Hill Avenue, Irvine, California 92714, Telephone 714/540-6730, TWX 910-595-1764.

Microdata

Don't let this business get ahead of you.

The EDP Seminar Series will give you what you need to know.

The world of EDP is caught up in a continuous revolution. It's only 24 years since the first business computer made its appearance, and we've gone from tubes, batch processing and single-site giants to multiprogramming, time sharing, data communications, giant minicomputers and hundreds of other technological innovations that were unheard of only recently. Keeping up with this revolution is difficult, to say the least. And that's why we've created the EDP Seminar Series.

The EDP Seminar Series gives you practical applications of the newest advances in computer management. What you learn will save you time and money, because each course is geared to practical dollars and sense application.

Remember, these are seminars, not lectures, and you'll be learning by doing in a shirtsleeve atmosphere. Workshops are an important feature of the Seminars, and round table discussions and shop talk luncheons complement the seminar presentations. The workbooks and course materials are yours to keep, so you'll always have a handy reference to all you've learned.

We've selected leading experts from around the country to guide each of our Seminars. They are highly accomplished specialists in their fields, experienced in presenting their techniques to industry and management. If you're involved in one of the areas shown, you should attend the EDP Seminar Series this fall. What you learn will benefit your company, your installation, and you.

Performance Evaluation and Improvement

Saul Stimler, author of *Data Processing Systems: Their performance, evaluation, measurement, and improvement* will lead this two day seminar on measurement techniques designed to save your installation money. As well as system performance at your own installation, topics covered include: Criteria for quantifying performance, pencil and paper analysis of a system, Benchmarking techniques, Realtime, Batch and interactive time sharing systems.

Cost for the seminar, including continental breakfasts and luncheons and all course materials is $250.

New York	Hilton	May 10-11
Chicago	Hyatt Regency O'Hare	May 17-18
Wash., D.C.	Stouffer's National Center Inn	May 24-25

Data Communications Course #1010 – Practical Data Communications Systems & Concepts

Dr. Dixon Doll, the nationally recognized teleprocessing consultant will lead this two day seminar on the newest advances in data communications. The course covers areas like SDLC, HiD LoD, DDS, newly approved major revisions to WATS, and the impact of Satellite Carriers.

Total Cost, including workbook, reference materials luncheons and continental breakfasts is $350. Additional registrants from the same company qualify for the reduced rate of $300.

Write for Spring Schedule

Data Communications Course #1020 – Advanced Teleprocessing Systems & Design

Also led by Dr. Dixon Doll, this course is a follow-up to course #1010. Special emphasis is given to techniques that minimize operating costs in commercial data communications networks. This three day seminar covers procedures, approaches, and algorithms for evaluating and cost optimizing network operations. Total cost, including an extensive set of customized course materials, is $450. Additional registrants from the same company qualify for a reduced rate of $400.

Write for Spring Schedule.

Legal Tools for Computer Contracting and Protection

Under the instruction of Roy N. Freed, a nationally known lawyer, author and educator in the field of computer law, you'll learn how to increase your advantage in dealing with vendors that supply your installation. As well as practical discussion and review of your own contracts, subject areas covered in this $2\frac{1}{2}$ day seminar include: Negotiations, Contracts, Warranties, Avoidance and resolution of disputes, Security, Fraud, Taxation, and Techniques for handling any transaction. Cost for the entire seminar, including continental breakfasts, luncheons and all course materials is $325. Additional registrants from the same company are charged only $275.

Seattle	Airport Hilton	May 5-7
Chicago	Hyatt Regency O'Hare	Jun. 16-18
New York	Summit Hotel	Jun. 23-25

How to Increase Programming Productivity

John W. Brackett, PhD, Vice President of SofTech, Inc., will lead this two day seminar for technical managers on the state of the art of Software Engineering. Under his direction you will learn how to: create more precise and visible analysis and design; reduce integration problems; improve software reliability; incorporate visible outputs into the software development cycle; increase programmer productivity; and improve programming management methods. Topics covered include: Structured programming; Top-down analysis, design, implementation; and Chief Programmer teams. Cost for the entire seminar, including continental breakfasts, luncheons, and all course materials is $300. Additional registrants from the same company are charged only $250.

Wash., D.C.	Stouffer's National Center Inn	April 26-27
Atlanta	Hyatt Regency	May 3-4
St. Louis	Mariott at Lambert	May 24-25

THE EDP SEMINAR SERIES

Sponsored by COMPUTERWORLD
Managed by THE CONFERENCE COMPANY

☐ **Please reserve space for me at the following seminar(s):** ____________________
____________________ City ____________________ and send details

☐ Please send me more information on the ____________________ seminar

To **Ed Bride**
Vice President, Editorial Services
The Conference Company
797 Washington Street
Newton, Mass 02160

Name ____________________ *Title* ____________________
Company ____________________
Address ____________________ *City* ____________________
State ____________ *Zip* ____________ *Phone* (______) ____________

Note: If time is short, you may reserve space at any seminar by calling collect. Call Miriam Ober at (617) 965-5800

IMS Micro Kit Aimed at Hobbyists Good for Cash Flow

By Molly Upton
Of the CW Staff

SAN LEANDRO, Calif. – IMS Associates, Inc. is busily selling its Imsai 8080 microcomputer system, which evolved as a spinoff of the firm's development of its Hypercube.

The Imsai 8080 is available in kit form and, while the firm thought it was selling the kit to hobbyists, it is now receiving quantity orders for the product.

"It's hard to know who's a hobbyist," Eric Stewart, in charge of marketing the Imsai 8080, said.

Over half the orders are from commercial and OEM users, according to Ed Faber, a member of the marketing department. Apparently many of these hobbyists were connected with firms seeking a low-cost, microprocessor-based system.

Based around Intel's 8080 chip, the Imsai 8080 system can be linked together to form a three-dimensional Hypercube, Stewart said.

The Imsai 8080's shared-memory facilities allow micros in the same cabinet to share the same memory and run the same or different programs in parallel with each other, he said.

The system is expandable up to 64K bytes of memory and can handle peripherals as large as a 50M-byte drive, he added.

Mini users are switching to the Imsai 8080, Stewart remarked, and said he can see shipments running at the rate of 1,000 per month.

The price for a basic 8080 without memory or I/O gear is $499 in kit form. This includes a microprocessor unit board, front panel control board, power supply, expander board with space for six card slots, two 100-pin edge connectors, four card edge guides and a cabinet with room for up to 22 card slots.

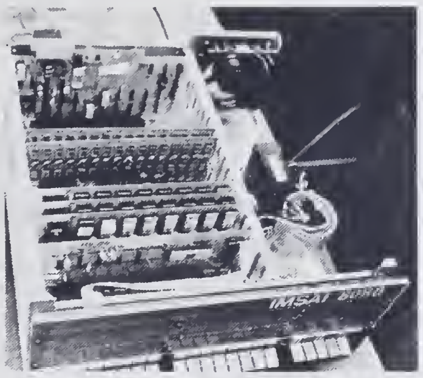
The firm sells the 8080 through computer stores and directly, Stewart said, estimating there are about 20 such stores in the country.

Popular With OEMs

One of the features popular with OEMs is the ability to plug the front panel into any slot, allowing debugging of a system configured as a dedicated controller, Stewart said.

Software available includes an assembler, monitor, text editor and loader in paper tape with listings. Imsai plans to develop Fortran for the unit, but has no date set, Faber said.

While the firm is shipping its 8080 in quantities, it is preparing to deliver its first 108 intelligent disk system, Faber said. Orders for the system are "encouraging" and are coming largely from end users. The OEMs are talking with IMS, he said.


CW Photo by M. Upton

Imsai 8080

The market for the 108 is very large, he said, adding the disk is on the verge of catching on. The 108 controller, which can accommodate up to 64 interacting micro units, was designed to relieve the CPU of the processing load normally associated with data base access functions.

The market for the firm's Hypercube will develop more slowly, Faber said. First shipments will be in six to nine months, he added.

The system, a microprocessor array [CW, Oct. 29], was designed to prevent system crashes caused by user software through the use of processor nodes. In each node there are two processors, one dedicated to system overhead and communications tasks, with the other free to execute user code.

The four-year-old firm is private and handles consulting engineering work on special black boxes and interfaces. The architectural concepts for the products evolved out of this work, Faber said.

IMS has no thought of going public, he added.

Two Regional Shows in California

Regional computer shows are cropping up all over, with two of them working the California turf this winter.

The California Computer Show, held recently in Anaheim, drew 2,000 attendees to view exhibits, according to Norm De Nardi Enterprises, sponsor.

Another show is planned April 22 in Palo Alto at the Hyatt Cabana with over 40 exhibitors showing minicomputers, CRTs, printers, plotters and other peripherals, according to show organizers.

Other regional exhibits by De Nardi include Dallas on May 27 and New England in the Boston area next September.

The Orange County Invitational Computer Conference, which will be held March 25 at the Newporter Inn in Newport Beach, Calif., will feature eight technical product seminars for OEMers as well as exhibits by 26 vendors.

Repesentatives of Data General Corp., Hewlett-Packard Corp., Interdata Corp., Tally Corp., ISS/Univac, Threshold Technology and Pertec Corp. will describe their products.

The Invitational Computer Conferences are directed at the quantity buyer, according to the sponsor, B.J. Johnson & Associates of Newport Beach.

There have been seven such seminar/displays this season.

Contracts

British Airways Decides on Dier

LONDON – British Airways has signed agreements with Dier Computer Corp. Ltd. for maintenance of its central computer sites here and for a used IBM system.

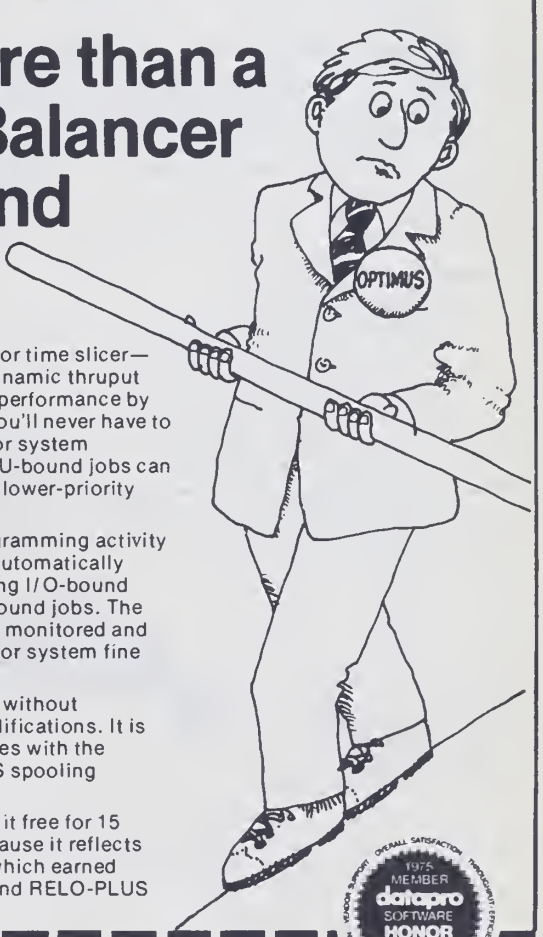
The total value of these contracts is over $3.5 million, Dier said.

Dier is an Australian-based firm. Its subsidiary, Data Processing Customer Engineering, will handle the maintenance at the British Airways sites, which include 360 and 370 equipment as well as Univac gear.

Other Awards

System Development Corp. has been awarded a contract from the Savings Association Central Corp. of Santa Monica, Calif., to design an electronic funds transfer system.

Aquila BST Ltd., a Canadian subsidiary of System Development Corp., has been awarded a $1.7 million contract to provide computer services to the Justice Department of the Quebec Provincial Government.


OPTIMUS
. . . it's more than a
Partition Balancer
for DOS and
DOS/VS.

OPTIMUS is not just a balancer or time slicer—it's a lot more! OPTIMUS is a dynamic thruput optimizer which improves CPU performance by 15% to 30%. With OPTIMUS, you'll never have to worry about partition lockouts or system degradation, because heavy CPU-bound jobs can be run without affecting jobs in lower-priority partitions.

OPTIMUS analyzes multiprogramming activity at specified time intervals and automatically adjusts partition priorities, giving I/O-bound jobs higher priority than CPU-bound jobs. The user selects the partitions to be monitored and can even alter the time interval for system fine tuning.

OPTIMUS installs in minutes without supervisor or IBM software modifications. It is release independent and operates with the ASAP, POWER and POWER/VS spooling systems.

Optimize with OPTIMUS! Try it free for 15 days. We know you'll like it because it reflects the same standards of quality which earned Datapro awards for our ASAP and RELO-PLUS packages.

1975 MEMBER datapro SOFTWARE HONOR ROLL

Universal Software, Inc.
136 White Street, Danbury, Ct. 06810
(203) 792-5100

___Call me about an OPTIMUS trial.
___Send me additional information.

Name ___ Title ___
Company ___ Phone ___
Address ___
City ___ State ___ Zip ___

The only Disk Utility System that made the Software Honor Roll in '75!
The Book on the Disk Utility System
by Westinghouse

1975 datapro HONOR ROLL

The only disk utility system that made it!

The Westinghouse Disk Utility System was rated among the 25 best packages out of 1400 in Datapro Research Corporation's annual user survey.

Ratings were based on ease of installation, vendor support, documentation, throughput/efficiency, and overall satisfaction.

A fast, reliable system for backup of disk resident data to tape or disk, it replaces slower, less flexible software supplied by hardware vendors.

Send coupon today for our Disk Utility Information Manual—or a 30-day trial of the system.

Westinghouse

Westinghouse Electric Corporation—OSP
2040 Ardmore Boulevard
Pittsburgh, PA 15221

Please send: ☐ Disk Utility Information Manual
☐ salesman to discuss applications
☐ 30-day free trial

Name___
Title___ Phone___
Company___
Address___
City___ State___ Zip___
Computer___ GP system release no.___

Memorex Going Outside to Extend Markets

By Molly Upton
Of the CW Staff

SANTA CLARA, Calif. – Memorex Corp.'s agreement with Nippon Peripherals Ltd. (NPL) to market, service and manufacture NPL's version of the IBM 3340 disk drive is part of the firm's plan to procure products from other sources when feasible, according to William H. Warren, director of product and business planning for Memorex.

When viewing its long-term objectives for the period 1974 to 1980, Memorex decided to concentrate its R&D budget on those areas where it already had technical expertise and to go outside for products that required technical strengths the firm didn't have, Warren said.

By offering products from other manufacturers, Memorex can get a proven product to market sooner, he said.

This minimizes the risk of in-house development, but is expensive in the long run, he added.

In addition, adding products helps utilize the sales force as effectively as possible, he said.

Although Memorex has not yet announced it will have a 3340-type product, Warren said he would like to see the firm in this market area.

The agreement with NPL gives Memorex the right to market, service and manufacture the drive in the U.S. and also to market it in Japan, he said.

Memorex had looked at the 3340 market and saw limited opportunity to make much money if it had to incur development costs, Warren explained.

The firm has indicated it will be in the IBM 3350-type market his year, which could possibly lead to other products also, he said.

He explained these products evolve from the same technology utilized in the data module for the 3340, which Memorex makes.

The data module, with an enclosed head, comprises most of the new developments in the unit, he said. This technology is also applicable to the 3350 and possibly other future disks by IBM. he said.

Memorex's first venture in procuring product from another firm was its agreement with Advanced Memory Systems (AMS) for add-on memory.

Memorex's business is divided into two segments, media and equipment, Warren explained. The bulk of revenues in the equipment area comes from sales to end users of IBM-type equipment, he said, but the OEM area is growing.

He cited as an example recent contracts to supply Digital Equipment Corp. with $4.4 million worth of 100M- and 200M-byte disk drives.

The primary focus within the equipment organization is on storage products, but the communications sector has made headlines lately with the 1377, its 3270-type terminal [CW, Feb. 23].

Memorex was already in the communications marketplace in 1974 with its 1240 hard-copy terminal and its 1270 controller, which competed with the IBM 270X. "But we had never really prosecuted the terminal marketplace," he said.

The firm wanted to be in the programmable controller transmission marketplace, which it saw as the key to the communications area. After that it could add terminals and have a range of offerings, he said.

Prefers OEMing 1380

Memorex stopped its in-house development of a 3705-type programmable controller in the middle of 1975 and bought rights to what it calls the Memorex 1380 from Computer Communications, Inc. (CCI), which Warren said is roughtly similar to the CC80.

Memorex has not exercised its license to manufacture the 1380, but prefers to OEM it from CCI, he said.

The real reason for buying the unit from CCI was that the software for the system was already developed, he said.

Warren said the firm has resumed production of the 1270 because, after it announced the 1380, orders for the 1270 increased.

Many customers, he said, are not ready to go to programmable controllers because they realize it will be a long time before they are able to utilize the capabilities.

Although Memorex would like to offer a full range of products, including terminals, Warren said the risks are very high and beyond its capabilities within the short term.

CW Photo by M. Upton

William H. Warren

However, the logical first step, he said, was the development of its 1377 CRT, the IBM 3270-type unit that physically plugs into the IBM control unit.

Depending on how sales proceed for the 1380 as well as the 1377, Memorex could decide to develop a controller for distributed processing work, he added.

One key to the success of the 1377 will be reliability and therefore low service costs, he said.

Wyly Withdraws UCC Banking Bid

DALLAS – Wyly Corp. has decided it no longer wants to sell University Computing Co.'s (UCC) Banking Division and has withdrawn from negotiations with Optimum Systems, Inc.

Citing increased progress toward reducing debt and improving liquidity through other transactions, Chairman Sam Wyly said the sale is no longer desirable.

The firm reduced its long-term debt by $36.4 million through the sale of its Gulf Insurance subsidiary and has settled a contract with LTV which released $4.4 million cash from escrow, Wyly explained.

Burroughs Names Rouse BMG Head

DETROIT – Burroughs Corp. has appointed Ben L. Rouse vice-president and group executive of the Business Machines Group (BMG), the U.S. marketing organization for Burroughs' DP products.

Rouse succeeded William Ten-Brink, who was appointed vice-president of marketing for the BMG's midwest region.

Executive Corner

Manuel Garcia succeeded Rouse as vice-president and group executive of the International Group.

Microdata Selects Bleininger

IRVINE, Calif. – Microdata Corp. has named Leonard S. Bleininger as vice-president of peripherals in a move to strengthen its position in the OEM peripherals market.

Rapaport Elected DCC Chief

FAIRFIELD, N.J. – Digital Computer Controls, Inc. (DCC) has elected Harold Rapaport, chairman of the board, as chief executive officer succeeding John Ackley, who resigned.

Ackley will continue as a board member and act as consultant to the board.

Arthur Rush was elected president and chief operating officer.

Other Moves

■ Paul D. Stein has been appointed vice-president of manufacturing for Data General Corp.

BROKERS • LEASING COMPANIES • USERS
COMMA ANNOUNCES "COMMA QUOTES"

COMMA, the pioneer in 3rd party maintenance leads the way again with this new innovation . . . with COMMA-QUOTES you can request a package bid including any or all of the following items:

- Recon/Refurb
- Install/Deinstall
- Feature Work

COMMA-QUOTES means-

- A single national interface
- Highly expedited responses (within 2 hours)
- Confirming hardcopy of each bid
- Professional, experienced staff
- Consistent, competitive pricing and scheduling

Call COMMA-QUOTES (toll free) 1-800-527-3280 for work across town or across country.

LOOKING FOR MINICOMPUTER SOFTWARE?
LIKE TO SAVE MONEY?

Reuse existing minicomputer software! Save 10-90% of your expected development costs. The MINICOMPUTER SOFTWARE QUARTERLY lists available, proven minicomputer programs from many sources. Each comprehensive listing describes in detail:

* Program functions
* Hardware/OS requirements
* Price * Support * Warranty
* Organization to contact

MINICOMPUTER SOFTWARE QUARTERLY

Yearly subscription (4 up-dates) US/Can. $75.00-Foreign $100.00)

Software Sources Entered Free. Send For Listing Forms.

INTERNATIONAL MANAGEMENT SERVICES, INC.
70 Boston Post Road, Dept. C, Wayland, Ma. 01778 (617) 358-4903

BRANKO SOUČEK

MICROPROCESSORS & MICROCOMPUTERS

Just published—a multi-angle description of the application, programming, and interfacing techniques common to microprocessors. Concentrates on detailed presentations of representative microprocessor families. Covers newly-developed microprocessors, high-speed microsystems, and bipolar LSI circuits.

(0 471 81391-5) 1976 624 pp. $23.00

Available at your bookstore, or write
Wiley-Interscience, P.O. Box 092
Somerset, N.J. 08873
WILEY-INTERSCIENCE
a division of John Wiley & Sons, Inc.
605 Third Avenue
New York, N.Y. 10016
In Canada: 22 Worcester Rd., Rexdale, Ontario
Price subject to change without notice. A-5589-WI

For Lease
Teletype*
Model 33ASR
with tape
perforator
and reader—
$59**per month
on 1-year lease
Model 33KSR
send/receive–
$45**per month
on 1-year lease
Includes nationwide maintenance service.

Call or write:
RCA Service Company
A Division of RCA
Technical Services
Bldg. 204-2, Camden, N.J. 08101
Phone (609) 779-4129
*Registered trademark of Teletype Corp.
**slightly higher for 90-day lease.
RCA

NEW 370/158
MOD 1
- ITC QUALIFYING
- AVAILABLE 3/19, 4/16, 4/30, 5/21

MODEL 3 UPGRADE ALSO AVAILABLE

Contact:

Gene Chappell John Delaney
Fred Cholette (315) 474-5776

CONTINENTAL INFORMATION SYSTEMS
CIS
CORPORATION

CIS USA, Midtown Plaza,
Syracuse, N.Y. 13210
(315) 474-5776, Telex: 93-7435
CIS Europe, S.A., 80 Chaussee de Charleroi,
1060 Brussels, Belgium, Tel: 538-90-93, Telex: 26025

POSITION ANNOUNCEMENTS

SYSTEMS ANALYST

Lge established Mfr seeks analyst with manufacturing bkgd. NCR exp preferred. Good Co, Good benefits. $17,500 Fee Pd.

ROBERT HALF
PERSONNEL AGENCIES
12 S. Main St.
Memphis, TN 38103
(901) 523-8950

PROGRAMMER/ANALYST
Burroughs 1728
Start to $16,000 + Bonus

Northwest food processor seeking self motivated individual with a broad application background and Cobol, RPG, communication and programmer/analyst skills. MCP, DMS II, NDL on-line experience desirable.

Position located in the beautiful Northwest, the world's finest outdoor recreation area.

Send resume to: Dir. of Personnel, AGRIPAC, Inc., P.O. Box 5346, Salem, OR 97304. *An Equal Opportunity Employer. M/F*

DIRECTOR OF DATA PROCESSING NORTHAMPTON, MASS.

City seeks professional to develop and implement integrated data processing system. Required are five years experience (two in a supervisory capacity) with systems creation, programming, testing, documentation, implementation, and staff training. Degree preferred. Forward resume and salary requirements to:

Personnel Director
City Hall
Northampton, Mass. 01060

PROGRAMMER ANALYST

Meo-sized mfr needs 2 Programmers. System 3 Model 15, RPG II. Knowl of MRP, DBOMP & acctq applications very helpful. Salary range $14-17K.

EDP ANALYST/PROGRMMR

Lge progresssive mfr seeks EDP professional for 50% systs & 50% prog. 3-5 yrs exp. Knl of IBM, BURROUGHS, COBOL & BAL. Fringes excel. Salary $18-22K.

ROBERT HALF
PERSONNEL AGENCIES
333 North Michigan Ave.
Chicago, IL 60601
(312) 782-6930

KEENE STATE COLLEGE OF THE UNIVERSITY SYSTEM OF NEW HAMPSHIRE

(Enrollment 2,424). Instructor or Asst. Professor, Computer Science/Math. Ph.D. required. Strong background in Computer Science. $11,000-$12,000. Send resume to Dr. Charles Riley, Chairman, Math Department, Keene State College, Keene, New Hampshire 03431. Keene State College is an Affirmative Action/Equal Opportunity Employer.

1130 SYSTEMS PROGRAMMER
SENIOR POSITION

for

32K Meta-4 with tapes & 2314 disk cytos & Fortran IV (H) environment.
Location: New York Metro area.

Send Resume
1130 Assembler
Experience Essential
CW Box 4619
797 Washington St.
Newton, Mass. 02160

COMPUTER SCIENCE:

The College at Geneseo, SUNY anticipates making a lecturer appointment in the Computer Science Faculty to begin Fall 1976. The position requires the ability to teach COBOL, business applications, and applied statistics. Terms and salary ($12,000-$13,000) depending on qualifications. Masters degree required, send letter of application, vitae, and transcript to: Dr. Lee T. Bryant, Computer Center, State University College, Geneseo, N.Y. 14454. *Equal Opportunity/ Affirmative Action Employer.*

MANAGER DATA PROCESSING

Bachelor's degree pref. Exp. in higher education and management necessary. IBM 360/30 DOS. $14-17,000. 12 mo. position.

Send resume to:

David C. Foank
Dean of College Services
Corning Community College
Corning, N.Y. 14830

by April 2, 1976. C.C.C. is an equal opportunity affirmative action employer and adheres to the guidelines of Title IX.

PDP-11 PROGRAMMERS

An established, profitable, and growing computer services company in Central New Jersey seeks PDP-11 Programmers for major new development project. Minimum 2 years experience in MACRO-11. Either commercial programming or IBM 360/370 experience a strong plus. Reply in confidence giving employment and salary history to:

Personnel Office, Petroleum Data Corp., Bldg. D, 1101 State Road, Princeton, N.J. 08540

DATA SYSTEMS MANAGER

Excellent opportunity at West Virginia University. Work involves managing a Personnel Data System to insure the input and output of meaningful and useable data. Background in statistics, computer science, mathematics and programming. Work experience in computerized information systems. Starting salary $12,000 annually plus excellent benefits. Forward resume to: Mr. E.J. Podeszwa, Personnel Officer, West Virginia Univeristy, Morgantown, WV 26506. *An Equal Opportunity/Affirmative Action Employer M/F.*

PROGRAMMER/ ANALYST

Several Growth positions exist with dynamic Boston area mfr .or creative COBOL Prog's with at least 2 yrs exp. Requires strong COBOL bkgd, proven capability in problem analysis & a desire to excel. Knowl Data Base a +! Sal to $18K (fee pd). Contact Bill Grady (in confidence).

ROBERT HALF
PERSONNEL AGENCIES
140 Federal St.
Boston, Mass. 02110
(617) 423-6440

PROFESSIONALS ONLY

If you are a programmer, programmer/analyst, systems analyst, or EDP professional and would like the most individualized job search offered in the data processing field today on a local or national level, forward your resume, with present salary and geographical preference, in strict confidence, to:

DATA PROCESSING PROFESSIONALS
99 Pratt St.
Hartford, Conn. 06103

APPLICATIONS PROGRAMMER

Plymouth State College of the University System of New Hampshire has an opening for a programmer. Candidate should have a bachelors degree or equivalent experience/technical training, minimum 1 yr. experience in administrative programming using COBOL and/or Basic. Knowledge of DEC PDP-11 and RSTS/E highly desirable. Salary $9-11,000 depending on background and experience. Send resume and availability information to:

F. Glynn Rodean, Director
Computational Services
Plymouth State College
Plymouth, N.H. 03264

Plymouth State College is an Affirmative Action/Equal Opportunity Employer.

APPLICATION PROGRAMMER

To work in a fast moving DOS/VS Data Processing shop. An immediate opening for a programmer who will get involved in Data Base/Data Communications Applications in the Health industry. Currently installing the first of several CICS DL/1 applications. At least two years of solid COBOL programming experience required and experience with CICS, DL/1 a definite plus.

SCOTT & WHITE HOSPITAL
2401 S. 31st Street
Temple, Texas 76501
Contact: Mildred Lewis
Personnel Dept.
(817) 778-4451, ext. 2528
An Equal Opportunity Employer

PROGRAMMERS/ ANALYSTS

Computer Hardware Inc. has open positions for programmers and system analysts. Applicants must have a combination of two to three years experience in systems design and programming using ANSI-COBOL, FORTRAN IV or RPG II. 4 year college degree preferred. On-line, telecommunications, time-sharing and database management experience highly desirable. Write to:

COMPUTER HARDWARE INC.
P.O. Box 4496
Sacramento, Calif. 95825

PROJECT LEADER

Industrial client installing on-line order entry system using CICS. Prior project resp & systems development exp req'd. This opening is with fortune 500 co. offering Exclnt growth possibilities & stable work environment. $18K (fee paid). Contact Stan Durbas (in confidence)

ROBERT HALF
PERSONNEL AGENCIES
111 Pearl St.
Hartford, Conn. 06103
(203) 278-7170

SYSTEMS ANALYSTS
$17,000 to $20,000

Planned growth of clients MIS staff has generated the need for 3 Systems Analysts. Emphasis is being placed on the design, development, and implementation of large scale financial systems. Qualified candidate will have a college degree, 4-years experience of which 2 must be in the design of large scale financial and accounting systems. This is an urgent need with an Indiana based corporation.

The following are a few of the many positions currently available:

Syst. Engineers	$25,000
Mfg. System. Ana.-7-	$23,000
Jr. Syst. Eng.	$22,000
Process Control	$22,000
Syst. Analysts	$20,000
Programmer	$18,000

All positions are Fee Paid. Forward your resume in total confidence to:

PERSONNEL CONSULTANTS, INC.
Gateway Towers
Pittsburgh, Pa. 15222
Phone: (412) 471-6103

PROGRAMMERS/ ANALYSTS

The Dayton area's largest and most progressive financial institution has openings for experienced Programmers and Systems Analysts.

Two years NCR NEAT/III or NCR COBOL experience desired. Experience with CIF, CIRF and/or commercial bank applications preferred.

We offer an excellent starting salary plus an outstanding fringe benefit program. Send resume to:

Personnel Division

WINTERS NATIONAL BANK AND TRUST CO.

Winters Bank Tower
Dayton, Ohio 45401
Affirmative Action
Equal Opportunity Employer

SENIOR SYSTEMS ANALYST

The University of Missouri is rapidly expanding into DB/DC technology for administrative applications and has openings for two Senior Systems Analysts to help lead this effort. Application areas include Accounting, Personnel/Payroll, Budget and Student Records. Minimum qualifications for positions are: B.S. Degree (or equivalent) in Business, Mathematics or related field with 3 to 5 years experience as systems analyst/project manager in one or more of the above application areas utilizing a DBMS and telecommunications; higher education experience a plus. Send resumes to: University of Missouri-Personnel Services, 309 Hitt St., Columbia, Missouri 65201.

An Affirmative Action/
Equal Opportunity Employer

EDP OPPORTUNITIES

SYSTEMS ANAL/PROJ LEADER-Conn. locat Industrial products IBM 360 installation. PICS exp. $22,000
LEAD PROGRAMMER ANAL-NJ Maj industrial co, BS/BA + 3 yrs COBOL 1 yr CICS ON-LINE order processing inventory controls $20,000
PROJECT LEADER-Fortune co. NYC headquarters. BS/MS-personnel info systems . . . .$21,000.
SYSTEMS ANAL-NYC. Banking/fincl applications $20,000
Bill Borrelli (212) 349-3610

Wm. HARRIS AGENCY
150 Broadway
New York, N.Y. 10038

PROGRAMMER ANALYST

Immediate openings for experienced programmer/analyst. Applicants should have minimum 3 years experience in design and implementation of business systems and data bases under ANS COBOL.

Telecommunications, data base languages, and conversion skills particularly valuable. Construction or manufacturing background helpful.

Current environment is IBM 360/50 DOS-GRASP-EPAT with conversion to OS/HASP in progress.

Salary commensurate with ability, education and experience.

Send detailed resume including salary history and requirements in confidence to:

Townsend and Bottum, Inc.
Manager of Programming
P.O. Box 1368
Ann Arbor, Michigan 48106

PROGRAMMER/ ANALYSTS

National Organization, Manhattan Headquarters, seeks qualified individual for major DB/DC Projects using CICS/VS—DL/I software.

Requires 3-4 years commercial applications with emphasis on ANS COBOL, DOS/VS 360 Environment.

Educational opportunities consistent with basic qualifications available. Advancement potential inherent in DC/DB. Company paid benefit program.

Send resumes to:
CW Box 4621
797 Washington St.
Newton, Mass. 02160

ASSOCIATE DIRECTOR OF UNIV. COMPUTING CENTER UNIV. OF COLORADO

FUNCTIONS

Direct supervision of all technical operations of the Computing Center; initiate and conduct development and research in the field of computing working with hardware and software. This is a University Position reporting to the Director of the University Computing Center. Salary competitive.

PREFERRED QUALIFICATIONS

Doctoral degree and three years of technical responsibility in computing centers. Experience and state-of-the-art knowledge in hardware engineering, telecommunications, mini-computers, micro-processors, and modern time-sharing systems. Technical expertise with third generation mainframe hardware, preferably Control Data Cyber Series computers. Experience in initiating and conducting research and development programs. Teaching and research qualifications appropriate for an academic appointment.

FACILITIES

Central site facility contains a dual CDC 6400 computer system offering both batch and interactive services. Eleven remote job entry terminals serve four campuses and the Colorado Division of Highways. Eighty-four person staff.

Applications must be received by April 26, 1976.

Respond with a letter of application and a resume to:

A.J. Sardello, Chairperson
Computing Center Search Comm.
Computing Center
University of Colorado
Boulder, Colo. 80309
Equal Opportunity/
Affirmative Action Employer

MANAGER DATA PROCESSING

Bachelor's degree pref. Exp. in higher education and management necessary. IBM 360/30 DOS. $14-17,000. 12 mo. position.

Send resume to:

David C. Foank
Dean of College Services
Corning Community College
Corning, N.Y. 14830

by April 2, 1976. C.C.C. is an equal opportunity affirmative action employer and adheres to the guidelines of Title IX.

SENIOR SYSTEMS ANALYST
IMMEDIATE OPENING

The Office of Management Information and Computing seeks a Senior Systems Analyst with BA or equivalent in math or business related field. Applicant must have at least five years of DP experience, three as a Systems Analyst. Experience in higher education applications, COBOL and IBM/ DOS are required. Applicants with experience in on-line systems and DBMS are preferred. The successful candidate will be involved in the development of applications under our integrated database.

We offer an excellent benefits package.

Salary commensurate with qualifications. Please send resume and references to Box 24A, Waterman Building, University of Vermont, Burlington, Vermont 05401.

An Affirmative Action Employer

Westinghouse

COMPUTER & INSTRUMENTATION DIVISION

SOFTWARE DEVELOPERS

Westinghouse Electric Corporation, a recognized leader in Systems Software for the IBM DOS DOS/VS environment has an immediate need for software development professionals at our Orlando, Florida facility.

Applicants should have 3-5 years experience in:

- IBM DOS DOS/VS Internals
- Communication Monitors
- Operating Systems Interfaces

Assembler language programming is required, college degree preferred. If you qualify, please send resume in complete confidence to W.J. Young.

Westinghouse
COMPUTER & INSTRUMENTATION DIVISION
1200 West Colonial Drive Orlando, Florida 32804
An Equal Opportunity Employer M/F

Analysts, Programmers, Technical Writers

Immediate openings exist for innovative data processing professionals in our banking and hospital development divisions. Experience with Burroughs or IBM Software required. Salaries and benefits are outstanding. Write in confidence to:

FLORIDA SOFTWARE SERVICES INC.
P.O. Box 2269
Orlando, Florida 32802

Customer Service Engineers

25 Openings Worldwide. Experience with PDP 11/45.

We're specialists in "Customer Engineer" Extractions.

Bill Gill And Associates
5724 W. Diversey Av.
Chicago, Ill. 60639
(312) 622-7711

SENIOR ANALYST PROGRAMMER

Excellent opportunity for SENIOR ANALYST with project capabilities. Degree and 3-5 years experience in manufacturing environment. Disk, bill of material background helpful.

Growth opportunity for PROGRAMMER with minimum of 2 years of COBOL experience in manufacturing environment.

Submit resumes to:

UNION STEEL PRODUCTS COMPANY
A Division of Eagle-Picher Industries
500 N. Berrien Street
Albion, Michigan 49224
An Equal Opportunity Employer

Technical Support Specialists

San Francisco Peninsula-based industry leader wants you!

AMS, the industry leader in development of the MOS memory systems technology, invites you to join our excitingly innovative organization located on the beautiful San Francisco Peninsula. AMS offers growth, personal potential, leadership, profit sharing, excellent benefits and stimulating challenge to qualified individuals with a minimum of 3 years' experience as Technical Specialist on 360 or 370/CPU/memory. CPU training invaluable. You will be involved in initial install support, initial training support, broad customer base, engineering liaison, technical seminars and worldwide travel.

For immediate consideration, please send your resume complete with salary history to: Professional Employment, Advanced Memory Systems, 1276 Hammerwood Avenue, Sunnyvale, California 94086.

We are an equal opportunity employer.

AMS
Semiconductor

Join The Leader In The Dispersed Data Processing Industry

We have immediate openings for

SOFTWARE INSTRUCTOR

Responsibilities will include the development and presentation of professional course work, to existing customers, covering Datapoint's software systems. Teaching and software experience required. Moderate travel.

SYSTEMS ENGINEER INSTRUCTOR

You will be responsible for the training of systems engineers, a position that requires rapid learning of technical information and excellent teaching abilities. Systems engineering or equivalent technical and marketing experience required. Moderate travel.

If you are looking for career development, rapid advancement, and a long term association with a company that has added important new dimensions to the business world of computing

We'll work on your future together.

Send your resume including salary history and requirements to:

Mr. Don Whynott, Recruiting and Employment Manager

9725 Datapoint Dr.
San Antonio, Texas 78284

An affirmative action employer committed to equal opportunity

DATAPOINT CORPORATION

SUPERVISOR SYSTEMS PLANNING

Connecticut General Life Insurance Company is seeking an experienced data processing professional to supervise in our system planning group. The successful applicant should have:

- 5-8 years progressive DP experience.
- 2 years hardware/software planning experience with large scale IBM and/or Univac equipment. Knowledge of OS/VS highly desirable.
- At least one year in a direct supervisory position.

Salary to low twenties depending on experience and qualifications. Pleasant suburban environment; excellent benefit package with child care option available.

Send resume with salary requirement to:

Elizabeth Conover
Connecticut General
Life Insurance Company
Bloomfield, CT 06152

Equal Opportunity Employer m/f

SYSTEMS ANALYST

Progressive company seeking an experienced Systems Analyst with at least 3 years experience in systems design. Manufacturing background desirable, preferably with on-line experience. Challenging position will consist of design and implementation of Data Processing systems related to materials management, manufacturing and accounting.

Kershaw offers a 4-day, 40-hour work week; competitive salary and fringe benefits.

Send resume, in confidence, to:

Iris Muffley

KERSHAW
MFG. COMPANY
2205 West Fairview Ave.
Montgomery, Ala. 36108

An equal opportunity employer

EDP Careers

Since 1968

Compu-Search has sought out exceptional individuals with Data Processing related skills for large and small companies throughout the United States and Canada. We also have been very successful in locating challenging new positions for thousands of people who have requested our assistance. If you are a talented achiever interested in hearing about situations that will best meet your goals, contact our office near you in complete confidence. We keep a close watch for the best opportunities available to you locally and nationally.

Ann Arbor, Mi.	(313) 769-1720
Appleton, Wisc.	(414) 731-5221
Baltimore, Md.	(301) 823-9010
Boston, Mass.	(617) 262-5050
Chicago, Ill.	(312) 297-7102
Cincinnati, Oh.	(513) 651-5500
Cleveland, Oh.	(216) 623-1030
Columbus, Oh.	(614) 436-3200
Denver, Co.	(303) 320-4221
Detroit, Mi.	(313) 358-5730
El Paso, Tx.	(915) 778-9411
Erie, Pa.	(814) 454-2886
Greensboro, N.C.	(919) 375-4911
Houston, Tx.	(713) 228-8671
Indianapolis, Ind.	(317) 257-4261
Lansing, Mi.	(517) 694-1153
Los Angeles, Ca.	(213) 930-1313
Louisville, Ky.	(502) 456-4330
Milwaukee, Wisc.	(414) 273-4430
Minneapolis, Mn.	(612) 339-7741
New Orleans, La.	(504) 581-3655
Norfolk, Va.	(804) 461-4744
Omaha, Neb.	(402) 397-8115
Peoria, Ill.	(309) 676-2452
Philadelphia, Pa.	(215) 665-9430
Pittsburgh, Pa.	(412) 355-0500
Raleigh-Durham, N.C.	(919) 781-0400
Rochester, N.Y.	(716) 325-1660
St. Louis, Mo.	(314) 731-6800
Stamford, Conn.	(203) 327-1010
San Francisco, Ca.	(415) 981-5950
Troy, Mi.	(313) 585-4200
Wichita, Ka.	(316) 263-4991

COMPU SEARCH
Div. of Management Recruiters, Inc.

SYSTEMS PROGRAMMER

Winnebago Industries, an NYSE-listed corporation, is expanding its Data Processing Department and is seeking a Systems Programmer.

The individual's responsibility will be to assist the Systems Specialist in maintaining the software to support on line or remote systems.

Applicant should have degree in computer science, math, engineering, or accounting, coupled with 3 years associated programming. Will consider equivalent experience in lieu of a degree. Applicant must have experience with Assembler language coding. Use of DOS/VS, CICS, or 370X with intelligent RJE modes desirable, but not necessary.

We offer an excellent starting salary, a broad fringe benefit program, and an excellent opportunity for personal growth and development.

To explore this opportunity, send your resume or call Sharon L. Hansen.

WINNEBAGO.
Box 152, Forest City, Iowa 50436
(515) 582-3535
An Equal Opportunity Employer M/F

SYSTEM 2000® TECHNICAL MARKETING SUPPORT

MRI Systems Corporation

MRI is seeking qualified candidates for the position of SYSTEM 2000/TP 2000 Technical Marketing Support representative for the Northeast and Southwest regions. The TMS Representative will be responsible for supporting one or more Marketing Representatives. His functions will include technical sales presentations, proposal development, demonstrations, benchmark coordination, and pre-sales applications analysis. The TMS position is a highly visible and critical one in the overall marketing process and provides excellent advancement potential in this multi-national, rapidly growing Data Base Management Company. The ideal candidate will have in-depth experience in customer support in a software marketing environment as well as in applications/data base design experience using one or more of the major Data Base Management Systems on the market today. In addition he will be a strong self-starter and have a good record of self-management and inter-personal communications. Compensation is open and includes sales-related incentives, profit and equity participation, and full medical and life insurance coverage.
Call or write in strict confidence to:

Jim Tillinghast
MRI Systems Corporation
P.O. Box 9968
Austin, Texas 78766
(512) 258-5171

An Equal Opportunity Employer

SYSTEMS PROGRAMMING SUPERVISION

MacMillan Bloedel Limited, Canada's largest forest products company, requires a senior Systems Programmer for their Vancouver Data Centre 370/145 running under VS1.

The successful candidate will have at least two years' experience in software support of OS/VS1, and at least one year's experience in support of INTERCOM or a similar Communications system.

Experience with ANS COBOL, RES, ADABAS or ROSCOE would be advantageous.

We offer a full range of benefits.

Applicants who qualify are invited to send resumes, including experience, education and salary expected to:

Ms. B.E. Heath, Placement Officer

MacMillan Bloedel

1075 West Georgia Street
Vancouver, B.C. Canada

PROGRAMMERS & ANALYSTS

Excellent
Positions Available
Nationwide
With Top Corporations

- CHOICE TARGETS OF OPPORTUNITY-CAREERWISE
- OFFERING STATE OF THE ART ADVANCEMENT
- CHOICE OF LOCATIONS

We Use Proven Executive Search Methods Only!

FELLS AND BAROODY, INC.
THE NO-NONSENSE ALTERNATIVE
2 PENNSYLVANIA PLAZA, SUITE 1530
NEW YORK N. Y., 10001 • PHONE 212-736-9404

SOUTH FLORIDA COMPUTER PRODUCTS MARKETING

International Communications Corporation, a subsidiary of Milgo Electronic Corporation, has the following positions immediately available in Computer Products Marketing:

MARKET RESEARCH SPECIALIST

The individual selected for this position will be responsible for both short and long term analysis of the market to insure that terminal systems and computer products developed by ICC meet the industry's needs and are available for distribution at the proper time. A background in terminal and communication systems with specific experience in Market Research is required. Hardware and software experience would be advantageous.

MARKETING SYSTEM ANALYST

This position will involve both sales support and engineering liaison for product definition and implementation. A background in terminal and communication systems is required. Specific experience should include indepth knowledge of the most widely used terminal systems in the areas of protocol, systems capabilities and human factor design.

Both positions are excellent from the standpoint of current salary offering and ideal career growth potential. In addition to complete company benefits, we are offering a liberal relocation allowance as well as the fringe benefits of South Florida living. To arrange for your interview, send your resume in complete confidence to Al Garcia.

INTERNATIONAL COMMUNICATIONS CORPORATION
8600 N.W. 41st Street, Miami, Florida 33166
A Milgo Company
An Equal Opportunity Employer

VM/370

LEAD SYSTEM PROGRAMMER

Applicant must have:

5 years experience including 2–3 years with VM/370 on large 158 or 168 and prior experience on CP/67 or large OS systems.

In depth knowledge of CP & CMS and their interrelationships.

Experience in system modification, performance tuning and addition of new functions.

Background in teleprocessing system design and implementation.

Experience in directing other programmers in complex projects.

Position offers outstanding salary and benefits for qualified applicant.

Contact: E. S. Haskell, Amoco Production Company, Research Center, P.O. Box 591, Tulsa, Oklahoma 74102 (918) 664-3637

Amoco Production Company
An Equal Opportunity Employer M/F

PROGRAMMER/ANALYST

The State University of New York at Binghamton is seeking a Programmer/Analyst with expertise in the support of academic research and instruction. This position offers an opportunity to design and create essential academic computer programs and to be responsible for the organization of consulting services. The position will work with a progressive and interested academic community in a broad range of areas ranging from music to chemistry.

The position requires a bachelor's degree, and three years of applicable experience. Expertise in statistical data processing and/or mini-computer systems is desirable.

SUNY-Binghamton is one of four university campuses in the State University of New York System. The campus of 9,000 students is located near a variety of cultural and recreational resources. The salary for the position is competitive, with an outstanding benefits package. SUNY-Binghamton is an equal opportunity employer.

Please send your resume by April 15 to:

Dr. David L. Stonehill
Director, Computer Center
SUNY-Binghamton
Binghamton, N.Y. 13901

At Robert Half, your counselor is a EDP professional.

We figure it takes one to know one.

Whether you're seeking employment or employees in any of these specialized areas, you can be sure the person you speak with at Robert Half understands the field from your side. Call any Robert Half office, we speak your language.

ROBERT HALF
PERSONNEL AGENCIES

Specialists in Finance, Banking, Accounting and EDP.

Albuquerque / Allentown / Atlanta / Baltimore
Boston / Buffalo / Charlotte / Chicago / Cincinnati
Cleveland / Columbus / Dallas / Denver / Detroit
Hartford / Houston / Indianapolis / Kansas City
Lancaster / Long Island / Los Angeles / Louisville
Memphis / Miami / Milwaukee / Minneapolis
Newark / New York / Oakland / Omaha / Orange, Cal.
Philadelphia / Phoenix / Pittsburgh / Portland
Providence / San Diego / San Francisco / San Jose
Scranton / Seattle / St. Louis / Stamford
Tampa / Washington / Wilmington
London, England / Toronto, Canada / Vancouver, B.C

PITTSBURGH EDP CAREERS

We are EDP recruiting specialists concentrating on positions in the Pittsburgh and Tri-State area. The following is just a cross-section of the opportunities that are available.

Systems Programmers (5)	To 26K
IBM hdwe, sftwe. OS internals	
Sys/Analysts (4)	24K
Mfg. & Fin.	
Prog/Analysts (7)	To 19K
Cobol, Mfg, Bus & Banking	
Programmers	To 18K

Cobol, IBM & Honeywell. Send resume *including salary history* in confidence to Barry Lopez, C/O:

CAMERON OF PGH., INC.
428 Forbes Ave.
Suite 412
Pittsburgh, Pa. 15219
(412) 391-7409

BUSINESS SYSTEMS ANALYSIS

Permanent faculty opening September 1976. Duties include teaching basic Business Information Systems, first year and advanced COBOL and Data Base Design and implementation; advising students; and committee assignment. MBA with concentration in Business Systems Analysis plus 10 credits toward DBA or PhD required. Consideration may be given for MBA and extensive Business Data Processing experience. Rank and salary dependent upon qualifications as follows: Professor - 7 years experience - $18,000 - $22,000. Associate Professor - 5 years experience -$ 18,000. Assistant Professor - 4 years experience - $12,000 - $15,000. Send applications to Dr. Charles L. Cooper, Business Management Department, Indiana University of Pennsylvania, Indiana, Pa. 15701, by April 2, 1976.

An Affirmative Action/Equal Opportunity Employer

VS TECHNICAL ANALYST

Financial organization requires individual with minimum of three years experience in the installation, maintenance and modification of IBM large systems control program software (OS/MVT, OS/VS2, TSO, IMS) to support two (2) 370/158 environment. Opening exists in First Computer Services, Inc., a subsidiary of First Union Corporation. We offer a salary commensurate with your experience and complete benefit package. Please send resume including salary history requirements to: Melvin Carr, Personnel Supervisor, First Union Corporation, Employment Department, 704-374-6463, Charlotte, N.C. 28288, An Equal Opportunity Employer M/F.

EDP DIRECTOR

A young, rapid growth company with an on-line computer systems network in the Eastern U.S. seeks a strong individual who has managerial expertise in computer based systems to direct and manage the efforts of programming, customer services and data center operations toward the goal of providing top service to clients.

Applicant should have a minimum of five years data processing managerial experience, and a B.S. degree in computer science, business management or equivalent. Familiarity with IBM 360 on-line systems under CICS, DOS and programming experience a plus.

Excellent salary based on experience. Good employee benefit package and work environment. Send complete resume and salary history to:

CW Box 4613
797 Washington St.
Newton, Mass. 02160
An Equal Opportunity Employer

Good people are hard to find
but we are always looking...

Marketing Representative
Systems Engineer

DATA BASE/DATA COMMUNICATIONS

We are looking for Marketing Representatives and Systems Engineers for our district offices with hardware or software sales/technical experience. You will be responsible for selling and supporting Cincom's products, TOTAL, ENVIRON/1, and SOCRATES, which are the recognized leaders in data-based, on-line information systems. The professionals we need to cover these areas will need experience in IBM 360/370 plus a variety of experience in business applications. Teleprocessing knowledge is also desirable.

To arrange for a local interview, send your resume or call in confidence to the attention of Dan Rebsch, Cincom Systems, Inc., 2300 Montana Avenue, Cincinnati, Ohio 45211, (513) 662-2300.

District offices: Atlanta, Boston, Chicago, Cleveland, Dallas, Detroit, Kansas City, Los Angeles, Minneapolis, New York, Philadelphia, Pittsburgh, San Diego, San Francisco, Santa Clara, St. Louis, Washington, D.C.

Cincom Systems, Inc.

An Equal Opportunity Employer

position announcements

MANAGEMENT CONSULTANT

Major NJ CPA firm seeks aggressive, technically oriented professional for it's MAS group. Education in computer sciences, good communicator & in-depth exp with state of the art technology. Excel partnership potential. $30-$35K. Fee paid

ROBERT HALF PERSONNEL AGENCIES

522 Fifth Avenue
New York, NY 10036
(212) 221-6500

DATA PROCESSING (Project Leader), City of Pittsburgh

Manager of Computer Systems Analysis and Programming Salary-$20,000 Range. Excellent Fringe Benefits. Seeking highly qualified individual with minimum of 5 years management experience in medium to large scale computer installation. To direct systems development and maintenance in Cobol business systems oriented shop. Must have balanced technical DP background and DP managerial ambitions. On-line and governmental systems experience preferable. Applicants must be residents of the City of Pittsburgh. Send resume to:

CIVIL SERVICE COMMISSION,
1st Floor City County Bldg.,
Pittsburgh, PA 15219

position announcements

PROGRAMMERS

Systems and Applications

A progressive, expanding, well financed Midwest company has the following openings:

Systems Programmers conversant with an Operating System, preferably RSX-11, although DOS would be acceptable.

Assembly Language Programmers familiar with the PDP-11 family, knowledge of RSX-11 is desirable but not essential.

The work involves developing a VDT accessed, real time, information storage and retrieval system using a unique concept. A great ground floor opportunity for ambitious, hardworking people who enjoy challenges, and would like to try new ideas. The system has application nationwide and for those desiring travel, some will be available. Excellent starting salary and benefit program.

Send complete resume with salary requirements to:

CW Box 4622
797 Washington St.
Newton, Mass. 02160
Equal Opportunity Employer

PROGRAMMERS/ANALYST

We are seeking a Data Processing Specialist to work in a high volume EDP environment. A New England based bank holding company, we have an opening for a Programmer/Analyst with experience in finance application and portfolio accounting. The position will require a minimum of 2 yrs PL 1 experience, OS/JCL. Familiar with IBM 370.

Send resume with salary requirements to Mrs. Eileen McGue, P.O. Box 351, Boston, MA 02101.

State Street Bank and Trust

Help us do our homework.

an equal opply employer M F

COMPUTER PROFESSIONALS...

Here's relocation the professional way.

National Computer Associates provides you with the most professional and effective way to relocate. Wherever in this country you want to live, we can find exactly the position you want . . . and before you move!

For details, contact the NCA office nearest to you. No charge, and no obligation.

NATIONAL COMPUTER ASSOCIATES

Computer Placement Firms interested in becoming an NCA member . . . Contact Steve Weber, Compass, Inc., 900 Asylum Ave., Hartford, Conn. 06105

CHICAGO
McCormick & Associates, Inc.
386 North York Street
Elmhurst, Illinois 60126
CLEVELAND
McCormick & Associates, Inc.
601 Rockwell Avenue
Cleveland, Ohio 44114
DALLAS
Data Processing Careers, Inc.
Suite 1109
Stemmons Tower West
Dallas, Texas 75207
DETROIT
Electronic Systems Personnel
1705 Fisher Building
Detroit, Michigan 48202
FLORIDA
Data Sciences Personnel, Inc
Suite 205
15490 N W 7th Avenue
Miami, Florida 33169
HARTFORD
Compass, Inc.
900 Asylum Avenue
Hartford, Connecticut 06105
LOS ANGELES
TaCS, Inc
3440 Wilshire Boulevard
Suite 1007
Los Angeles, California 90010
MINNEAPOLIS/ST. PAUL
Electronic Systems Personnel
801 Nicollet Mall, Suite 1716
Minneapolis, Minnesota 55402
NEW YORK
Botal Associates, Inc
405 Lexington Avenue
New York, New York 10017
PITTSBURGH
Electronic Systems Personnel
106 Lawyers Building
428 Forbes Avenue
Pittsburgh, Pennsylvania 15219
PROVIDENCE
Xavier Associates, Inc.
10 Dorrance Street
Providence, Rhode Island 02903
SAN FRANCISCO
The Computer Resources Group Agency, Inc.
303 Sacramento Street
San Francisco, California 94111
SYRACUSE
CFA Associates Personnel, Inc Agency
2530 James Street
Syracuse, New York 13206
TULSA
Data Processing Careers, Inc.
Suite 10, Park 21 Building
2626 East 21st Street
Tulsa, Oklahoma 74114
WASHINGTON, D.C.
ESP Systems Corporation
Suite 210
1211 Connecticut Avenue N.W.
Washington, D.C. 20036

position announcements

ROBERT HALF PERSONNEL AGENCIES®

Partial Listing

Systems Progr IMS, VS2 moving into MVS	To $24,000
Systems Progr CICS, MODEMS, OS/DOS	To $25,000
Programmer Neat 3 Level 2 CIF on-line	To $16,000
Progr Anal OS Cobol 370/145 CICS	To $18,000
Data Base Admin 370/135 DOS VS DL/I	To $20,000
Systems Anal On-line credit union	To $25,000

Client Company Pays All Fees
Phone or Write Duncan White
(213) 386-6805

Los Angeles, Suite 1914, 3600 Wilshire Blvd., LA 90010

Orange County, Suite 501, P.O. Box 1656, Orange, 92668

"Teleprocessing/Systems Internals" Programmer

Looking for more technical challenge and professional growth? Interested in designing your own teleprocessing system? Consider this staff position. We are expanding by adding new facilities and must develop communications systems. As a member of our staff, you will actively participate in the design, development and support of that system. We require a professional with extensive experience in OS/Assembler and a good background in on-line systems. Please send resume and salary requirements to:

CW Box 4623
797 Washington St.
Newton, Mass. 02160

Programmer

DOS/VS SYSTEMS PROGRAMMER

(4+ YRS. EXP.)

ROCOR INTERNATIONAL — a multi-division corporation, headquartered in Palo Alto. We are a leader in the transportation industry and we have an immediate opening need for a DOS/VS Systems Programmer. We require college education, extensive ALC systems experience and familiarity with COBOL DOS BTAM and CICS experience. We offer an excellent salary, liberal fringe benefits and rapid advancement opportunity in this dynamic fast growing corporation. All replies in confidence. Please submit current resume with salary history to:

Manager, Technical Support
ROCOR
INTERNATIONAL
P.O. Box 10062, Palo Alto, CA. 94303
Equal Opportunity Employer

POSITION WANTED

Looking For Computer Professional?

GREATER BOSTON AREA

HARDWARE: IBM 370 DOS VS · System 3 Telecommunications

APPLICATIONS: Payables, Receivables, Payroll, General Ledger Inventory Control, Fixed Assets, MRP Order Entry, Production, W-I-P, DBOMP

EDUCATION: BS in Business Administration

CW Box 4617
797 Washington St.
Newton, Mass. 02160

BUY SELL SWAP

For Sale
BURROUGHS L5000

Up to current RIN status, for sale by owner. Best offer. Call or write Doug Soderstrom or Diane Dye.

Epoch Properties, Inc.
199 Whooping Loop
Altamonte Springs,
FL 32701
(305) 834-9055

buy sell swap

FOR SALE

2314-A1
With 2 Channel Switch
2401-5
With DD and SIMS

NEED TO BUY

2860-1
Federal Data Corporation
(301) 652-5766
5454 Wisconsin Ave. Suite 755
Chevy Chase, MD 20015

WANTED TO BUY

Hazeltine
H-2000 Terminal
(immediately)

DEC KI-10 CPU
(for delivery Summer 1976)

The Catholic University
Of America
Computer Center
Washington, D.C. 20064
Attn: Karl C. Thomas

NCB For SALE or LEASE

3340-B2 (Available 8/1)
1442-N1 (Available Now)
2415-1 (Available Now)
2401-2 (3 Ea.) (Available Now)
2030-E (Available Now)
2030-F (Available 5/1)

(206) 455-1418
Northwest Computer Brokers
1621-114th SE, #215
Bellevue, WA 98004

360/20

SALE OR LEASE

- CPU 8K
- MFCM 4 Lines Print
- Printer 144 Print Pos.

EASTERN COMPUTER SERVICES
228 Belleville Tpk.
Kearny, N.J. 07032
(201) 997-4027

WANTED USED COMPUTER ROOM FLOORS

MANTARA CONST. LTD.
Box 8, Port Credit
Mississauga, Ontario
(416) 278-5617

FOR SALE MODEL 360/20

3 Disk Drives

Mfg. Memorex-620 Excellent condition and performance disk packs available. Call Andy Ext. 270

Lawrence Aviation Industries
(516) 473-1800

FOR SALE OR LEASE 370/135 GF

SN #60766, 4640, 6981, 7855, 7861, 4670, 4670, 4672, 3046, 3215

AVAILABLE NOW.

CONTACT: D. WYGODA
O.P.M. Leasing Services, Inc.
(212) 747-0672

buy sell swap

IBM 3270

Purchase/Leaseback Supply

IBM 360/370

110 Hi Vista Road
Sausalito CA 94965
(415) 332-6262
Member Computer Dealers Assoc.

IBM UNIT RECORD

All Maintenance
All Refurbished

LEASE - RENT - SELL

FOR SALE *(Surplus)*

	Model	Price
TrueData C R	800D	$1,700
TEK	604	600
HP CRT Dply	1310A	2,200
Houston Recdr	2000	600
Megatek Display	7210	1,500
Zeta Plttr 36"	3600	9,000
Zeta Plttr 12"	140-5	3,000
Centr. Prntr	306	1,600
Nova Cptr	1210-4K	2,400
Nova Cptr	1210-8K	3,000
Digitiz. w/OP	24"x24"	3,000
Nova Disc Dr	4046/4047	4.000
Nova Sync Adpt	4074	1,000
Nova MUL/DIV	8307	1,300
Hazel. CRT	2000	2,000

Asstd. Digitizers (Demos) Negotiate
Immediate Delivery Contact CEC
(301) 424-4790

LOW PRICED

360/40 LEASE
360/40 128K

Many features. We will consider any reasonable offer and terms for leases ranging from 6 months to 3 years. Immediate delivery. System currently working and under IBM maintenance.

FAIRCHILD NOBLE CORP.
G. FARRELL
(516) 293-7950

IBM 360/30
ALL IBM DISK
SYSTEM 65K CPU

Card Read Punch 500 CPM.
1403-2 600 LPM Printer.
2311 Disk (Qty. 3).
Immediate Delivery

$69,000

TBI Computer Sales
Div. Time Brokers, Inc.
75 South Greeley Ave.
Chappaqua, N.Y. 10519
(914) 238-9631

Nationwide broker/dealers of Data Processing equipment, Member Computer Dealers Assoc.

FOR SALE
360/50 I
(512K)
#6980, #6981, #6982, #7920
1052-07
Available April 15-30
Bob VanHellemont

CMI Corporation
23000 Mack Avenue
St. Clair Shores, MI 48080
313-774-9500
Member Computer Dlrs. Assoc.

Available for Lease

370/145

- 12-J2 level
- IBM or independent memory
- Serial # 11421
- Immediate delivery
- Principals only

Computer Systems
of America, Inc.
141 Milk Street
Boston, MA 02109
(617) 482-4671

Detach here, moisten and seal envelope securely before mailing.

Fold and insert order form (attached through binding) and remittance here.

Use the attached order form and this envelope for:

- **A new subscription**
- **New address**
- **New Title**
- **New Industry**

Order form is attached through binding. Be sure to include current label or label information when making a change.

First Class
Permit No. 40760
Newton
Mass.

BUSINESS REPLY MAIL

No postage stamp necessary if mailed in the United States

Postage Will Be Paid By

COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160

CIRCULATION DEPARTMENT

360/30 360/40

We Specialize

Will Buy or Sell
Any System or Configuration
Leases Available

CMI Corporation
23000 Mack Avenue
St. Clair Shores, MI 48080
(313) 774-9500
TWX 810-226-9708

Member Computer Dealers Assoc.

KEYPUNCH EQUIPMENT

(1) 25 UNIVAC 1710
Available for Sale
(1) 2.5 yr. old under
UNIVAC maintenance,
owned by user-
IMMEDIATE DELIVERY
(516)-694-4669

WANTED-
TELEX TAPE DRIVES
2 MODEL 4862

FOR SALE
256K AMS-ITEL CORE for
360/5C
-8 Hazeltine 2000-C CRT's
-8 UDS 202-B MODEMS
CONTACT:
G. PEACOCK
(713) 688-7238

FOR SALE

CDC 8090 Message Switching Computer complete with software, disk packs and disk controller and drive. Used successfully for years to send and receive automatically intercompany traffic and outside vendor traffic for large manufacturing company. Handles up to 60 high and low speed terminals mixed as required. Will also handle 1200 baud mag cassette terminals. Will provide training and full assistance in setting up domestic message switch center and, if needed, worldwide network. Available immediately. For information call or write: C.W. Britell, Finserv Computer Corp., 1462 Erie Blvd., Schenectady, N.Y. 12305. (518) 374-4430.

Available For Lease

360/65

Upgrade provision
to 370

Contact: E.Harnett

Computer Systems
Of America, Inc.
141 Milk Street
Boston, MA 02109
(617) 482-4671

1130
1401

Systems & Components

BUY-SELL-LEASE-TRADE

CMI Corporation
23000 Mack Avenue
St. Clair Shores, Mich. 48080
(313) 774-9500
TWX 810-226-9708
Member Computer Dealers Association

Lease or Sale

370/135

GF 196K

with Communication Adapter

Avail. June 1.
Call or Write Roger J. Foti
for attractive prices!

(212) 673-9300

I.O.A. DATA CORP.
383 Lafayette St.
New York, N.Y. 10003
Telex 126538

BUYING AND SELLING
UNIT RECORD 1401's 1130's
SYSTEM 3's 360/20's

Pioneer Computer Marketing
1165 Empire Central Place
Dallas, Texas 75247
Phone 214 630-6700
CHRIS ELDERS
PAUL DUTTON

COMDISCO COMDISCO

The World's Largest IBM Computer Dealer

SELLING	165KJ 1Oct. 1 Avail.
LEASING	155J2 DAT Avail. Now 145HO 16 Month Lease Avail. Now.
BUYING	135s, 145s, 155s, 158s, 165s, 135, 145, 158 TLP MACHINES APPLY

WRITE:
Comdisco, Inc.
2200 E Devon Ave
Des Plaines, IL 60018

CALL:
312/297-3640
East 201/568 9666
West 415 944 0323

TWX 910 233 2478
Member Computer Dealers Association

COMDISCO COMDISCO

Available For Sub-Lease
IBM 360/40 128K with

1–2540 Card Reader
1–1403 N1 Printer
1–2821 Control Unit
4–2301 Model 3 Tape Drives

System under IBM maintenance
Contact:

John D. Young
GORDON JEWELRY CORP.
820 Fannin
Houston, Texas 77002
(713) 220-8080, Ext. 276

FOR SALE
UNIVAC 9200/16K

1-0711-00 Reader
1-0603-04 Punch
1-F0868-01 Printer
132 Positions
1-2202-00 1001 Card
Controller with Interface

Currently in operation and under UNIVAC maintenance.

For sale by private party
Available June 1, 1976
H. Glogower
110 Route 4, P.O. Box 200
Englewood, N.J. 07631
(201) 567-8500

IBM
360/91K

2 MEG 2860-3 2870-1
Drum And Console
Available Summer 1976
LEASE OR SALE
Brokers Protected

Major Computer Inc.
9001 Bloomington Freeway East
Bloomington, Minn. 55420
(612) 888-4035
TELEX 290846
Member Computer Dealers Assoc.

DISTRIBUTORS

FOR TTY EQUIVALENT
CRT

Must service locally. Factory Board Swap is available. Exceptional financial terms. Net lease or purchase.

CW Box 4620
797 Washington St.
Newton, Mass. 02160

GENERAL AUTOMATION 18/30

- 32K CPU, 600 LPM Printer
- 10 Million Bytes of Disk Storage
- 9 Track 800 BPI Magnetic Tape
- 1000 CPM Card Reader
- Bensen Lehrner Drum Plotter

Asking $60,000
Available F.O.B.
Jacksonville, Fla.
Call John Jordan
(904) 396-2011

The S/370 hot line.

800-243-5307
(9AM-5PM E S T) In Connecticut, dial 661-4200.

RANDOLPH COMPUTER
COMPANY

DATA COMMUNICATION TERMINALS

Used terminals for sale at prices that will save your budget. You can satisfy your terminal requirements for speeds up to 30 characters/second with factory warranted equipment.

Equipment Available:

Teletypes	TWX/DDD
AJ630's	AJ841's
AJ4100's	AJ4120's

For all the details on these bargains, contact your local AJ office or contact Don Reichel

Anderson Jacobson, Inc.
1065 Morse Avenue
Sunnyvale, CA 94086
(408) 734-4030

SOLATRON
live voltage
regulator unit

#39-59-310 output
KVA Rating 10

Used one year with IBM Systems III Computer. No longer have computer system — excellent condition — $1,975.00. Call or Write:

J.D. ADAMS CO.
4045 Sinton Road
Colorado Springs, CO 80933
(303) 475-7550
Attn' Mr. Bob Walker

COM
FOR SALE

Immediate Delivery
Datagraphix 4440
Recorder

- - -FEATURES- - -

60KC Drive--Upgradable to 120KC
INPUTS: 7 or 9 track--556 or 800 or 1600 BPI: Odd or Even Parity--BCD, EBCDIC, ASCII Code
OUTPUTS: 16 Or 35 MM Microfilm: 105 MM Microfiche
EQUIPPED: Universal Camera/Function Decoder; LPS-D--with Channel Tabulate; Horizontal & Vertical Tabulating
PRICE: $51,000 Guaranteed Maintenance

PSDSI
109 Zayre Plaza
Chattanooga, TN 37402
Dan Paty, Mgr. (615) 267-9184

FOR SALE
CRT ASCISCOPES
made by LEAR SIEGLER

1. Built in acoustic modem
2. Independent cursor control
3. RS 232-TTY Compatible
4. 12" - 12 lines — 72 or 80 charac.
5. Printer mode

BOYNTON BUSINESS SYSTEMS
87 Route 208
Wallkill, N.Y. 12589
(914) 895-3369

MAGNETIC TAPE

1600 BPI 800 BPI
recertified
2400 $6.50
1200 $5.50

seals thinline thickline
IBM Memorex Scotch
released from
GEOPHYSICAL Archives not
work tapes
(713) 772-5557 C.A.R.D.
7575 Bellaire Blvd.
Houston, Texas 77036

Before you buy or sell used computer equipment consult

COMPUTER PRICE GUIDE

The Blue Book of Used Computers

Free Listing Service for Sellers
$3 per quarterly issue
$10 per annual subscription

tbi COMPUTER SALES
5 South Greeley Ave Chappaqua N Y 10514
914 238-9631

MINI SYSTEM MAINTENANCE

MIS Corp.
(212)962-0612

NEW LIFE! NEW LOOK

for all disk packs and cartridges.

CRI will completely rebuild and repair any pack or cartridges to "same as new" condition at the lowest prices available.

Guaranteed to perform to New Specs Fastest Turnaround — Call Jim Emmerich at (216) 267-6400 for over the phone quote:

Computer Resources, Inc.
4650 W. 160th St.
Cleveland, Ohio 44135

FOR SALE: 370/155
370/165 370/135
WANTED: 370/145, 360/65
370/158 370/135

(We purchase TLP and MAC machines)

IPS COMPUTER
MARKETING CORP.
467 Sylvan Avenue,
Englewood Cliffs,
New Jersey 07632
(201) 871-4200,
TWX (710) 991 9677

"MEMBER COMPUTER DEALERS ASSOCIATION"

IBM UNIT RECORD EQUIPMENT **IBM COMPUTERS**

024
026
029
056
077
082
083
084
085
087
088
089
402
403
407
408
514
519
523
548
552
557
602
604

We Buy,
Sell or Lease
360 - 20
System 3
1130

Special Sale
029's
All Models

Big Savings — up to 50% on Short Term Rentals

Call us for all your needs, we buy, rent and sell all types of IBM unit record equipment. Over 12 years of serving commercial and government requirements. All equipment rebuilt at our own factory and guaranteed for IBM MAINTENANCE. Contact: John Fennell V.P. for proposal. 212-689-4747
Cable: Leasatrón, New York Telex: 423857 LMC U1
116 East 27th Street New York, New York 10016

LMC Data, Inc.

BUY/SELL/LEASE/TRADE

IBM COMPUTERS
360's, 370's, System 3
All types: 1401, 1440, 1130, 1620 All peripherals

DISK PACKS — ALL TYPES
Completely recertified.
Guaranteed immediate delivery, lowest prices.
Unit Record Equipment — All models

DATA AUTOMATION COMPANY, INC.
4858 Cash Road, Dallas, Texas 75247
Call collect, (214) 637,6570
Member Computer Dealers Association

LEASE BUY SELL

DEAL WITH PROFESSIONALS IN PLACEMENT OF

PRE-OWNED **360/370** EQUIPMENT

"The Nations Largest Wholesale Dealer"
Member Computer Dealers Association

COMPUTER WHOLESALE CORP.

SUITE 441-447 NATIONAL BANK OF COMMERCE (504) 581-7741
NEW ORLEANS, LA. 70112

TO BUY, SELL
OR LEASE: CALL

214/630-6700

370-360
Systems I/O
Card Equipment

Pioneer Computer Marketing 1165 Empire Central Place Dallas, Texas 75247

WANTED

ALL 360 AND 370 SYSTEMS
AND PERIPHERALS
WE BUY · SELL · LEASE · TRADE

transdata
Member Computer Dealers Association

P.O. Box 47762
Dallas, Texas 75247
PHONE (214) 631-5647

NEW 370/168s

ITC QUALIFYING

Mod 1 Available 4/16/76

Mod 3 Available 5/14/76, 6/18/76

3850 MASS STORAGE SYSTEM ALSO AVAILABLE
CIS can guarantee you a new system and can deliver when you need it.

Call Fred Hughes or Bill Pomeroy
for more information.

CONTINENTAL INFORMATION SYSTEMS
CIS
CORPORATION

Contact the closest CIS office for complete details.
CIS USA Midtown Plaza Syracuse, N.Y. 13210
Tel 315-474-5776, Telex 93-7435
CIS Europe, SA 80 Chaussee De Charleroi 1060 Brussels, Belgium
Tel· 538-90-93 Telex 26025

SALE OR LEASE

145HO

16 Month Lease
Avail. Now

370/155J2 Avail. Now

IBM Computer Equipment
Specialists in the West

**BAY AREA
COMPUTER CORP.**
37 Quail Court Suite 3
Walnut Creek CA 94596

415-944-0323

Jerry Olson
Pat Baker

ACS

WANTED
IBM 029
KEYPUNCHES

FOR SALE
8K & 12K 1440
DISK SYSTEMS
7335 TAPE DRIVE
FOR 1440 SYSTEM

Member Computer Dealers Assoc.

ACS Equipment Corporation
7126 Mullins Drive
Houston, Tx 77036
(713) 461-1333

DIABLO/QUME PRINTERS

* FACTORY AUTHORIZED REPAIR
* SUPPLIES
* ACCESSORIES & OPTIONS

Reasonable Rates
Immediate Delivery by
Manufacturer of
SYSTEM 75 Computer
Terminal
Bedford Computer Systems
3 Preston Court
Bedford, MA 01730
(617) 275-0870

FOR SALE

3830 Model 2

with 8170
or 2150
Available Immediately

Call or Write
Bob McNamara
Capital Funding Corp.
2175 Lemoine Ave.
Ft. Lee, N.J. 07024
(201) 461-3158

HONEYWELL 200 COMPUTER SYSTEM: UNIT OR PARTS
(1) 201 Cent. Proc. w/2048 char. of mem. w/011 adv. prog. & 013 edit. feature.
(1) 202-1, cabinet 144401, 2048 char. mem. mod.
(3) 202-2, 4096 char. mem. mod.
(1) 203B-4 tape control to 8 204B-7 or 204B-8 units.
(1) 227 card reader/punch w/017 stacker select, S/N P632/27568. (IBM 1402)
(1) 207 card reader control in cabinet.
(1) 208 card punch control in cabinet.
(2) 206, 900 LPM prntr. & controller, w/032 ext. of print pos. from 120-132, w/033 vert. space feature. Mr. Damrell, Hardy Brush Corp.. Andover, Mass. 01810 or (617)475-4000

360/20

Nation's Leader

S/3

Components & Systems
Sell — Lease — Buy
CMI Corporation
CMI Building
23000 Mack Avenue
St. Clair Shores, Mich. 48080
(313) 774-9500
TWX 810-226-9708
Member Computer Dealers
Association
Deal With Confidence
Ask a CMI Customer

165

Serial Number 65003

FOR SALE

165	K	2880	2
3066	1	2870	1
3067	1	2860	2

**DAT box and memory available at your option.
Contact:
Bill Pomeroy,
Fred Hughes.**

CONTINENTAL INFORMATION SYSTEMS
CIS
CORPORATION

CIS USA
Midtown Plaza
Syracuse, N Y
13210
Tel. 315-474-5776
Telex 93-7435

CIS Europe, SA
80 Chaussee De Charleroi
1060 Brussels Belgium
Tel 538 90 93
Telex 26025

SALE!!!

Model 65
Model 50
Main Memory

Mod 65+, ¼ MB increments from 0 to 4 MB

Mod 50+, ⅛ MB increments from 128K to 512K; ¼ MB increments 512K to 1MB

New, eligible for ITC
Best prices anywhere!

Buy or lease

Call Bob Miller or
John Underwood
Tel. (612) 935-8811
TWX: 910/576-2913

FABRI-TEK INC
5901 So. County Rd 18
Minneapolis, Minn. 55436

SYSTEM/3
360/20
1130

BUY • SELL • LEASE

For a prompt, competitive quotation on your IBM needs, call or write today.

*"The Small
Systems Specialists"*

ECONOCOM
Economic Computer Sales, Inc.
1255 Lynnfield Road
P.O. Box 17825
Memphis, Tenn. 38117
(901) 767-9130
TWX 810-591-1205
Member Computer Dealers Assoc.

The S/370 hot line.

800-243-5307
(9AM-5PM E.S.T.) In Connecticut, dial 661-4200.

RANDOLPH COMPUTER
COMPANY

---

1 DAY SHIPMENT

FROM OUR 42,000 SQ. FT. ELECTRONICS FACILITY

UNIVAC
1108-II
3011-95 CPU
(3) 65K MEMORIES
432 DRUM, VIIIC TAPE
CTMC, CARD I/O, PRTR

IBM
360/65 IH
2314-1 DK FAC
HIGH SPEED I/Os
360/30E
2401-4 and 2401-6

PRINT BOUND?
DP4000 SATELLITE PRINT STATION
1333 LPM
★ NOW $9500

- 7 or 9 TR FORMAT
- USES 115V OUTLET
- SORBUS MAINTENANCE

SPECIAL

ASR 33 TELETYPES
$30/Mo (3-Yr), $35/Mo (2-Yr), $40/Mo (1-Yr)

-90-DAY WARRANTY-

DEC

PDP-11 MEMORY

MM11F (4K) . . .$950
MM11S (8K) . . .$1500
MM11L (4K) . . .$950
MF11LP (8K) . .$1500
MF11L (8K) . . .$1500
MM11L (8K) . .$1500

LA 30 PA Parallel Decwriter. . .$900

617-261-1100
AMERICAN USED COMPUTER CORP
Box 68 Kenmore Sta. Boston, MA 02215
Member Computer Dealers Association

For the End User's Answer When Buying, Selling or Leasing - IBM 360, 370, 1401, System 3 Unit Record Equip.-Please Call or Write

COMPUTER CLEARING CORPORATION

5025 N. Central Expressway
Suite 3046 Dallas, Texas 75205
Telephone (214) 528-5087

18 Years Experience, and — "We guarantee delivery at a fair market price."
George Jachimiec, President

FOR SALE

SYSTEM/3

We also buy,
sell or lease
360/20 and 1130.

COMPUTER BROKERS, INC.
P. O. BOX 34055
Memphis, Tn. 38134
Phone 901/388-2550

---

buying or selling

N.C.R. 395's • 400's • 450's • 299 • 399 • Century Series
Burroughs F.L. and TC's Series
Also
TELLER and
ADDING MACHINES, and
• NCR 31 • 32 • 33 • 41 • 42 • 441's

KEY-EXIMPORT CORP.
256 Livingston St.
P.O. Box 129)
Northvale, N.J. 07647

Call Us First!
OUR DIRECT LINE (201) 767-3444

The S/370 hot line.

800-243-5307
(9AM-5PM E.S.T.) In Connecticut, dial 661-4200.

RANDOLPH COMPUTER COMPANY

WANTED

BURROUGHS

L3000–L5000
L6000, TC 732
10-10-361;381;383
TELLERS

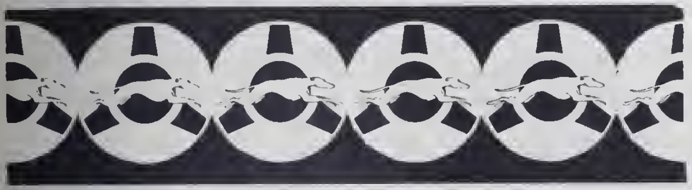
NCR

31-32-41-42-270

IBM

370–all models

IOA
I.O.A. Data Corp.
383 Lafayette St., N.Y. 10003
(212) 673-9300
Member Computer Dealers Assoc.



FOR ALL YOUR COMPUTER NEEDS GO GREYHOUND

For Sale
370 Features
3274 & 4640 for 3135
8100 for 3145
3210 Printer Keyboard

370 Tapes
1-3803-1 with 3551
4-3420-3 with 3550

Contact Your
370 Specialists
East - Dick Ventola (914) 949-1515
Midwest - Pete Ahern (312) 751-5430
South - M.W. Bill Tucker (214) 233-1818
West - Henry Paulson (415) 989-4023
Home Office - Tom Takash (602) 248-6037

GREYHOUND COMPUTER CORP., GREYHOUND TOWER
PHOENIX, ARIZ. 85077

BEFORE YOU BUY, SELL, OR LEASE, TAKE A 'SECOND' LOOK

NOW
buying: 370/145 370/135

selling: 370/158 370/168
370/165 3360-3's and 5's

leasing: 370/135 370/155 370/158

TLW COMPUTER INDUSTRIES INC.

ATLANTA 3570 American Drive, Atlanta, Ga 30341
404-451-1895 TWX 810-757-3654
CHICAGO 312-295-2030
WASHINGTON, D.C. 202-466-2470
LOS ANGELES 213-370-4844

FORSYTHE McARTHUR ASSOCIATES INC

IBM Computer Dealer & Lessor

919 North Michigan Avenue, Chicago, Illinois 60611
312 943 3770
Member, Computer Dealers Association

---

029 KEY PUNCH

For Sale

Sale Price $2200

THOMAS
COMPUTER CORP.
312-944-1401

PROFESSIONAL COMPUTER DEALERS IN THE WEST

SMI

SYSTEMS MARKETING, INC.
200 East Thomas Rd.
Phoenix, Ariz. 85013
Bob Russell
(602) 264-5444
Telex 667-334

IBM UNIT RECORD EQUIPMENT

Buy — Sell — Equity Lease
026 056 082 077 514 552 402
029 059 083 085 519 548 407
Also Other IBM Punch Card Equipment.

1620

Components or Systems
Guaranteed Eligible for IBM M/A
Immediate Delivery
Payment Plans to fit your Budget
CALL COLLECT
CMI Corporation
23000 Mack Avenue
St. Clair Shores, Michigan 48080
(313) 774-9500
TWX 810-226-9708
Member Computer Dealers Assoc.

BUYING OR SELLING?

CALL
Carterfone
Resale Specialists

Data Communications Terminals
Teletype Equipment
Modems and Couplers
Computer Peripherals
Minicomputers

Contact: Dave Johnson
(214) 350-7011

Carterfone
Communications Corporation
2639 Walnut Hill Lane
Dallas, Texas 75229
TWX 910-861-4039

WANTED TO BUY
OR LEASE: 370/158
AVAILABLE:
IBM MEMORY FOR 3158
Will Sell or Lease
THOMAS NATIONWIDE
COMPUTER CORP.
600 N. McClurg Court
Suite 3807A
Chicago, Ill. 60611
(312) 944-1401
1 Huntington Quadrangle
Suite 4S13
Huntington Station, N.Y. 11746
(516) 293-6010

BUY SELL TRADE LEASE

Specialists In IBM Core

FOR SALE

FTI 370/155 Core, 2 megs with ASA (CPU speed up)
IBM Core for 360/40 and 360/50
EM&M Core for 360/65 or 360/67, 1/2 meg and 1 meg
Fabri-Tek Core for 360/40, 128/256KB or 64/256KB
EM&M Core for 360/30, 64/128KB and 64/96KB
Standard Core for 360/50, 512KB to 1 meg
IBM 1051-N1 and 1052-8 for 360/30
Floating Point with 38 Slot CCROS for 360/30
IBM 2841 with 8 drive feature + 2311-1 drives
360/30F 2 channels, S/N 16249
SMI Core for 360/40, 128/256K & 256/384K
SMI Core for 360/50, 256/512K (2)
Fabri-Tek Core for IBM System 3/10, 8/32KB

dataware incorporated
2020 W. McNab Road,
Suite 109,
Ft. Lauderdale, FL 33309
305-971-2500
Member Computer Dealers Association

---

buy sell lease trade

370 -3420/3803 Tape - 3830/3330 Disk

360 -360/40 128 or 256K - 1419 Magnetic Character Reader

Sys 3 5410 16 or 32K 5445 Disk Drives 9610 Decision Data Data Recorders

dataserv equipment inc.
6820 Shingle Creek Parkway, Minneapolis MN 55430 (612) 560-5450
Vallco Financial Center, Suite 270
10050 North Wolfe Road, Cupertino, California 95014
In Western states call (408) 252-5700
Member, Computer Dealer Association

CONTACT
CSI

To BUY • SELL • LEASE • TRADE

AL SMITH
TENNY STANNARD
6111 1960 West
Suite 202
Houston, Tex 77069
(713) 444-0246

BILL McCAIN
BILL ROSELIUS
901 Office Park Plaza
Oklahoma City, Ok 73105
(405) 840-1911

KEN STEINBACK
JIM POWERS
11 South Meramec
Suite 1304
St. Louis, Mo 63105
(314) 727-7010

COMPUTER SALES, INC.
Member, Computer Dealers Assoc.

SYSTEMS AVAILABLE

360/65 IH (MARCH): 2860-2, 2870-1, 7117, 7920, 1052-7, (3) 2365-2

360/65 J (JULY): 2860-3, 2970-1 7920, 1052-7, (4) 2365-2

370/135 GF (APRIL): 3274, 4655, 6981, 7855, 3215, 7861, 3046

Contact: Jim Hartnett,
Lou Skavienski
(315) 474-5776

CONTINENTAL INFORMATION SYSTEMS
CIS
CORPORATION

CIS USA, Midtown Plaza Syracuse, N Y 13210
Tel 315 474 5776 Telex 93 7435
CIS Europe, SA 80 Chaussee De Charleroi 1060 Brussels, Belgium
Tel 538 90 93 Telex 26025

Available for lease:—

360/50 System
AVAILABLE APRIL 1ST

360/65 System
AVAILABLE JUNE 1ST

Calcomp 3330
AVAILABLE MAY 1ST

CONTACT!

Charles J. Dieges or
Stephen C. Zaleskie

Talcott Computer Leasing
1290 Avenue of Americas
New York, N.Y. 10019.
(212) 956-2858 or 956-4170
MEMBER. COMPUTER LESSORS ASSN.

ITEL WANTS TO

BUY: 370 / 145's, 155's, 158's

SELL: 2065, 1052, 2860-3, 2870-1, 2365's
I-J IBM 145 Memory
3360-3's
1403N1, 2540, 2821-1
2804-2, 4-2401-6

LEASE: 370 / 155 JI, 3215 available immed.
2065, 1052, 2860-3, 2870-1, 2365's

CALL: Linda Vaughn
(415) 983-0220

WRITE: ITEL Computer Products Division
One Embarcadero Center
San Francisco, Calif. 94111

ITEL
CORPORATION

---

158 2 YEAR LEASE AVAILABLE

NEW SYSTEM - 1 YR. FREE MAINTENANCE

Flexible lease terms — No obligation after 2 years. You can install your on-order system or we can provide a March '76 158.

Call Today For Details
Gene Chappell Fred Cholette John Delaney
CIS USA, Midtown Plaza, Syracuse, N.Y. 13210
Tel: 315-474-5776, Telex: 93-7435
CIS Europe, S.A., 80 Chaussee de Charleroi
1060 Brussels, Belgium Tel: 538-90-93 Telex: 26025

CONTINENTAL
INFORMATION
SYSTEMS
CIS
CORPORATION

IN CANADA

We specialize in
360/20, 360/30 & up
System 3, 370 Series
We buy your excess
IBM Equipment
CMI Company
P.O. Box 893
Windsor, Ontario N9A 6P2
519-258-8910

FOR SALE

Four IBM 2740-1
Terminals — $3,000/ea
Fifteen DPI 1101B
Badge Readers — $250/ea
Contact:
Mr. Frederick D. Lehmann
Martin Marietta Data Systems
Orlando, Florida 32805
(305) 855-1050 Ext. 7410

CALCOMP 3330 DISK STORAGE SYSTEM

Consists of:
1 - 1030 Controller
3 - 230 Disk Storage Units,
total of 6 spindles
Call or write:
L. Civittolo, Ext. 124
GenRad
300 Baker Avenue
Concord, MA 01742
(617) 369-4400

IBM 1130 USERS

10M word Disks and Controllers are now available from CHI for $9,000 + freight and installation. A limited number of these reconditioned units are available for immediate delivery. Contact Computer Hardware, Inc. at P.O. Box 4496, Sacramento, Calif. 95825, or phone the office nearest you.

Sacramento	(916) 488-4614
Buffalo	(716) 838-4095
Houston	(713) 467-0983

Wanted for
Immediate Purchase

370/135H

for April 15 - June 15 delivery
Will buy any Model 135 (FE-H)
or IBM MAC or TLP

Natl. Inst. for Public Svc.
(301) 656-5081

MINI COMPUTERS

Buying, Selling? Let us do the work for you and save you time and money!

AVAILABLE NOW:

Novas — all models — new & used; DEC 11's, New 8E's, 8 series, 12; Printers, disc drives, CRT's, etc. Timeshare systems — new & used — & many others.

MINI COMPUTER EXCHANGE

(408) 733-4400
TWX 910-339-9272

SALE OR LEASE

IBM Unit Record

024-$350
026-$1000
029-$2200
046-$1800
047-$2500
056-$250
059-$2000
077-$500
082-$900
083-$2200
084-$2500
085-$1200
088-$2900

089-$1500
402-$900
403-$1000
407-$1500
514-$900
519-$1200
526-$2000
548-$2000
552-$1200
557-$3500
602-$400
729-$750
1401 System-$11,000

THOMAS COMPUTER
CORPORATION
Suite 3807A
600 N. McClurg Court
Chicago, Ill. 60611
(312) 944-1401

For Sale or Lease
IBM 2314-A1
1x9 Disk Drive
& Control
IBM 2844
2nd Controller

CSI
COMPUTER-SALES. INC.
901 Office Park Plaza
Oklahoma City, Ok 73105
(405) 840-1911

FOR SALE
NEW MSI AND ELI
PORTABLE
DATA TERMINALS

60 MSI #2100 portable data terminals W/#2114 acoustic communication module and #2012 shoulder carrying case. $1,850 each. Price before last increase.

13 ELI (Telxon) Portable data terminals W/acoustical coupler and shoulder carrying strap. $1,200 each.

SELL ALL OR PART
KIMBELL INC.
P.O. Box 1540
Fort Worth, Texas 76101
(817) 924-3270
Ext. 286 or 366

Have approximately 120 surplus Singer ISF Model 800's to eliminate. Company in midst of converting to Singer Cassett Model 805. Best price gets lot but will sell as many as you require.

Write or Call
Mr. NORMAN LASKIN
(201) 541-1550
HERMAN'S
World of Sporting Goods
2 Germak Drive
Carteret, N.J. 07008

The S/370 hot line.

800-243-5307
(9AM-5PM E.S.T.) In Connecticut, dial 661-4200.

RANDOLPH COMPUTER
COMPANY

TURNKEY SYSTEMS

WANTED

Software package for Distributor Warehouse order entry, invoicing, and inventory control system for DEC PDP11/40 using RSTS/E operating system.

WANTED

Hotel or Motel reservation and accounting turnkey software package to be used on DEC PDP11/40 under RSTS/E operating system.

Contact John D. Hilburn, Jr. — Boese-Hilburn Electric Service Co., 412 W. 8th St., Kansas City, Mo. 64105 (816) 221-4292.

SOFTWARE FOR SALE

System/3 General Ledger

- Financial data base
- Any chart of accounts
- Report Writer
- Allocations

Get MORE from your System/3

SOFTWARE
INTERNATIONAL
Elm Square, Andover, Mass. 01810
(617) 475-5040

BURROUGHS ON-LINE

- DATA COMMUNICATIONS
- SYSTEMS DEVELOPMENT
- ON-LINE APPLICATIONS
  Payroll • Labor Distribution
  General Ledger • Financial
  Control

Proven on-line software from an experienced Burrough's user.

SYSTEMS RESEARCH
INCORPORATED
241 Building
East Lansing,
Michigan 48823
Ph. (517) 351-2530

Systems
Research
Incorporated

MMS Accounts Receivable

Eliminates the Long Wait.

- Database Design — All Cobol
- Open Item or Balance Forward
- Multi-company
- Flexible Aging
- Simplified Cash Posting

SOFTWARE
INTERNATIONAL
Elm Square, Andover, Mass. 01810
(617) 475-5040

software for sale

RPG II SYSTEMS

*ACCOUNTS RECEIVABLE
*GENERAL LEDGER
*PAYROLL
*INVENTORY
*UTILITY BILLING
*LINE GRAPH, LETTERS, OTHER

Multicompany Systems With Both User and Systems Documentation

Bancroft Computer Systems
P.O. Box 1533, Dept. C
West Monroe, La. 71291
(318) 388-2236

THIS MEDICAL BILLING SYSTEM

. . . can be a revenue generator for you

You can now have the capability of processing doctors, groups, and clinics with this complete system for billing and insurance processing. The system provides:

- Complete Insurance Forms
- Profile, RVS, ICDA Files
- Bal forward, Ledger
- COBOL or RPG II, DOS or OS
- 360/370 or mini-computers

Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 763-5144

BANK SOFTWARE

Financial Control System
Demand Deposit Accounting
Central Information
Mortgage Loan
Installment Loan
Savings
Time Certificates of Deposit
Commercial Loan
Payroll/Personnel

SOFTWARE INTERNATIONAL
Elm Square, Andover, Mass. 01810
(617) 475-5040

TOPS... ON THE BOTTOM LINE

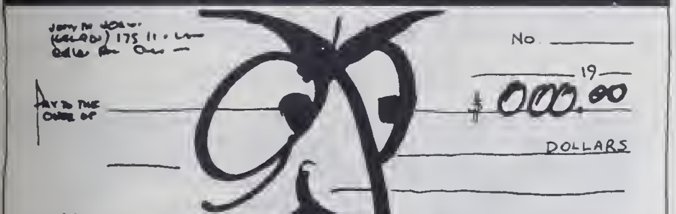
ACCOUNTING IV

General Ledger and Financial Reporting
Accounts Payable
Accounts Receivable
Call or write today for details.

informatics inc
65 Route 4
River Edge N J 07661
(201) 488-2100
The World's Largest in Software Products

Payroll

There's nothing that can ruin employee relations faster than an inaccurate pay check. Except missing a payroll.



The MSA Payroll Accounting System will help you guard against costly manual interventions in your payroll system • 90 Deductions and Other Earnings • Complete Taxes With "Alltax"® • Flexible Report Writer • Cost/Labor Distribution • Bank Services Including ACH • Over 450 Users • Interfaces With M S A's Full Service Personnel Management & Reporting System Including ERISA, OSHA and EEOC

For further information contact Bill Graves at 404-262-2376 or mail this coupon

MSA
THE FINANCIAL SOFTWARE COMPANY

Management Science America, Inc.
3445 Peachtree Road, N.E.,
Suite 1300, Dept. C-1
Atlanta, Georgia 30326

Chicago, 312-323-5940, Los Angeles, 213-822-9766, New York, 201-871-4700

Name __________

Company __________

Title __________

Address __________

City __________ State __________ Zip __________

Telephone __________

I am interested in
☐ Payroll
☐ Personnel Management and Reporting
☐ General Ledger
☐ Fixed Asset Accounting
☐ Accounts Payable
☐ Financial Information and Control
☐ Accounts Receivable
☐ Supplies Inventory Control & Purchasing

software for sale

TAXBREAK

***

Payroll tax calculation module

***

Calculates payroll withholding taxes for 50 states, federal, FICA and cities. COBOL. $875 complete.

Maintenance service on tax changes available for $225 per year.

ARGONAUT INFORMATION SYSTEMS, INC.
2140 Shattuck Ave.
#205
Berkeley, CA. 94704
(415) 845-7991

TIME & SERVICES

370/158

VS2-HASP/RJE, TSO
DOS Emulation
Disks-(18) 3330, (3) 2319
Tapes-(16) 3420 mod. 7
Printers-(5) 1403, (1) 3211

Excellent Technical Support
Very attractive rates on all shifts

Contact: Stu Kerievsky
(212) 564-3030
Datamor
132 West 31 St.
New York, N.Y. 10001

California TIME FOR SALE

360/50 256K
360/30 128K

MODERN FACILITY
1 BLK FROM SAN DIEGO FWY IN LONG BEACH, CA.
TECHNICAL SUPPORT
SIGNAL DATA PROCESSING, INC.
(213) 426-0516
CHUCK MC GLINCHEY

370-145 OS/VSI

Super Special — Midtown
192K Partition-From $50/Hr
1 Meg. Dedicated-From $90/Hr

Time & Services For All Systems

ANCHOR COMPUTER, INC.
212-697-4660
516-785-1788

IBM 360/370 USERS

COMPUTER TIME AVAILABLE

370/158

3 meg, 3330 (32m), 2314 (16m), 12 3420-7dd tape. OS/MVT, RJE, TSO, CICS, WYLBUR, ATS, DOS EMUL.

(3) 360/50's

512K, 2314 (8m), 6 3420-5dd, 1403, 2540

FOR FURTHER INFORMATION CALL RON ELLIS
(312) 346-1331

computer company
200 N. Michigan Avenue, Chicago
IL 60601

DALLAS

Computer Time Available
Honeywell-2200
Disk/Tape

FULL SHIFT/HOURLY
Call Warren Samuel
(214) 631-8270

time & services

360/370 OS USERS

370/158-2 MEG

MVT-HASP, RJE, CICS
(16) 3330's; (8) 2314's
(11) Hi-Speed Tapes; (3) Printers
(2) Transmission Control Units

Available Packages Include:

- ***WYLBUR***
- ***MARK IV***
- ***IMS***
- ***IDMS***
- ***GPSS***

Very Attractive Rates

Hasp Work Station Support
Complete Technical Support
24HOURS-7 DAYS

Call: Neil Rosen (212) 349-6000
Marketing International Corporation
15 Maiden Lane, New York, N.Y. 10038

ECLIPSE S/200

with writeable control store

RDOS REV. 4.02
$17.50 per hour per partition

THE HUNTINGTON GROUP
2400 Michelson Dr.
Irvine, CA 92715
(714) 752-6961
Software expertise available

I.B.M.-360'S

All shifts available on 4 - 360 computers with all features, 2314's, 2311's, 2402's - 800 BPI 9TRK, 2402's - 7TRK, 2401's - 1600 BPI 9TRK, 1403's - N1, 2540's, 2703 with ASYN & BISYNC Port.

Prices start at $35.00 per hour. We also offer complete Batch and Tele-processing services. Configuration can be modified to accomodate any 360 computer user. We have on site CE's.

UCS Computer Centers
Route 80
Dover, N.J. 07885

Contact Bill Kersey at
(201) 361-4007
or
Joe Kelly at
(201) 361-4008

time & services

MORRIS COUNTY

360/30 65K
2314's, 2401's loaded
CPU, 1403 N1
Card Reader Punch

As low as $25.00/per hour in volume. Also available Keydisk Services, offices, keypunch, all other related services on all shifts and weekends.

Call Larry Breault at
(201) 335-8200

Thomas National, Inc.

1775 Broadway, N.Y.C.

370/158
TIME SHARING
$6/CONNECT HOUR
ALL MAJOR SYSTEMS SUPPORTED

Convenient 57th St. Location
Open 24 Hours Per Day
Call (212) 765-8500

Full Service Data Processing Center for DOS USERS

(3) 262K Systems. 2314's and 2311's
Hi Speed Printers and Tape Drives
Partition or Stand Alone

Rel. 26.2 with GRASP

Many program package services available. We supply all operational technical support. Pick-Up & Delivery Service.

24 HOURS--7 DAYS

Call: Neil Rosen (212) 349-6000
Marketing International Corporation
15 Maiden Lane, New York, N.Y. 10038

REAL ESTATE

DATA PROCESSING OFFICE SPACE

60 Evergreen Place, East Orange, N.J.
Southwest Corner at Intersection of
Garden State Parkway and Interstate 280
9,535 Sq. Ft. Major Company Sublease
Will Divide

Low, Low Rental

- New installation
- 1900 sq. ft. raised floor
- Two 10-ton edpac units
- Fire protection

Additional Space Available

- 3 hour rated storage vault & job set up & dispatch room
- Parking for 23 cars
- Heating & ventilation 24 hours per day, 7 days/week

Option to lease 32K computer with disk & tape drives, plus telecommunications

Call Tom Curtis, V.P. (212) 582-8000

WILLIAMS®

Boothe Year Up

SAN FRANCISCO – Boothe Computer Corp. managed a turnaround for the year with earnings of $4.2 million or $1.09 a share compared with a loss of $3.6 million or $1.59 a share in 1974.

The turnaround was aided by a $3.8 million special credit from early extinguishment of debt.

In the last 1975 quarter, the firm earned $35,000 or 1 cent a share compared with a year-ago loss of $592,000 or 26 cents a share.

During the quarter, Boothe sold Boothe Airside Systems, Inc., which resulted in a pretax gain of $500,000. Boothe also made a provision of $500,000 for the anticipated loss on disposal of PSC Technology, Inc.

These operations have been accounted for as discontinued operations.

Modcomp Gains Slightly in 1975

FORT LAUDERDALE, Fla. – Modular Computer Systems, Inc.'s (Modcomp) earnings for 1975 increased to over $2.2 million or 75 cents a share compared with nearly $2.2 million or 72 cents a share in 1974.

Revenues increased to $38.5 million compared with $26.1 million last year despite an industrywide softening in the industrial market, which was traditionally the firm's strongest market segment, according to Kenneth G. Harple, Modcomp president.

The firm has been redirecting its marketing efforts, he said, which resulted in a strong order rate and a record backlog.

Orders are for increasingly complex systems and network configurations with extended delivery times rather than smaller systems, he added.

There will be increased profit pressure during the first half of 1976, he said, since many of the systems ordered in 1975 will be shipped in the second half.

"We anticipate this pressure will be alleviated during the second half, when revenues are expected to exceed first-half figures by approximately 50%," Harple added.

Data Disc Loss for Year Reflects Last-Quarter Inventory Write-Off

SUNNYVALE, Calif. – Reflecting a write-off of about $800,000 in obsolete and excess inventory in the fourth quarter, Data Disc, Inc. showed a loss of $804,000 or 77 cents a share for 1975 compared with earnings of $103,000 or 10 cents a share in 1974.

The firm will continue to incur losses in the first part of 1976, but is expected to become profitable in the latter part of the year, according to James J. Woo, the company's president.

The loss shown in the fourth quarter was part of a plan to invest resources in key operational areas, Woo said.

For the year, revenues of the peripherals maker declined to $7.2 million compared with nearly $10 million in 1974.

During the quarter, the firm lost $747,000 or 71 cents a share compared with a loss of $98,000 or 10 cents a share in the year-ago period.

Revenues again declined to $1.8 million compared with $2.5 million.

Backlog rose to $2.1 million compared with $1.8 million in last year's quarter.

GA Inks Half-Year Net in Black; Second-Quarter Results Also Up

ANAHEIM, Calif. – General Automation, Inc. (GA) scored improved results in the six months and quarter ended Jan. 31.

For the six months, the firm earned $193,000 or 8 cents a share, including a $75,000 special credit, compared with a loss of $1.9 million or 76 cents a share in the same period last year.

Revenues for the six months rose to $33.3 million compared with $28.2 million in last year's period.

For the quarter, the firm earned $186,000 or 3 cents a share, including the $75,000 credit, compared with a loss of $2.1 million or 83 cents a share in the year-ago quarter.

Revenues in the quarter grew to $18.3 million compared with $14 million.

"Our efforts to improve our manufacturing operations in Anaheim have resulted in a significant increase in sales and sound improvement in our operating margins over the same period of fiscal 1975," according to Lawrence A. Goshorn, GA president.

"In addition, we have made significant progress in keeping expenses in line," he said.

Milgo Takes Dive In First Quarter

MIAMI – Milgo Electronic Corp.'s first-quarter earnings plummeted to $360,000 or 21 cents a share compared with $1.2 million or 71 cents a share in the same period ended Dec. 31, 1974.

The firm attributed the decrease in volume to the decline in general business activity that resulted in lower incoming orders during the summer and fall of 1975.

Revenues slipped to $9.1 million compared with $10.2 million in the year-ago period.

Incoming orders have increased, the firm said, with December a record month.

The change in pace can be seen in the comparison of sales to orders for the period, Milgo said. Sales totaled $4.9 million compared with $6.3 million in orders.

...Toward the Bottom Line

Dividend time again – **Burroughs'** board has increased its quarterly dividend to 17 cents a share from 15 cents a share. The dividend is payable May 7 to shareholders of record April 9. . .**Hewlett-Packard** will pay a semiannual dividend of 15 cents a share April 15 to shareholders of record March 24. . .**Itel's** latest dividend was 5 cents a share on Feb. 27. . .**Electronic Tabulating** weighed in with an annual dividend of 15 cents a share March 5 . . .**Electronic Memories & Magnetics'** declared a 25 cents a share dividend to preferred shareholders payable March 10. . .**IBM** paid $1.75 a share March 10. . .**Centronics** will pay its second cash dividend of 10 cents a share April 5 to holders of record March 5.

$$$

Honeywell cut its outlay for R&D in 1975 from the 1974 figure. It spent $164.2 million in 1975 compared with $170.2 million in 1974.

$$$

Sierra Research's **Data Systems Division** concluded its second consecutive year of profitable operations, President Sherwood H. Calhoun said.

The State of Alaska

invites prospective bidders on the development and implementation of Automated Public Assistance, Food Stamp and Medical Management Information Systems to submit corporate resumes to:

Mr. E.P. Bardet
Chief, Research and
Data Processing
State of Alaska
Department of Health
and Social Services
Pouch H02E
Juneau, Alaska 99811

MISSISSIPPI STATE CENTRAL
DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 508 Robert E. Lee Bldg., Jackson, Mississippi, 29202, up until 2:00 P.M., April 19, 1976 for the following data processing equipment:

Request for Proposal No. 228 – for the acquisition of a hardware system capable of performing automated EKG analysis and interfacing with Hewlett-Packard and marquette EKG carts.

Request for Proposal No. 229 – for the acquisition of software necessary to perform EKG analysis from remote carts using the 12-lead scalar method and the orthogonal Frank leads.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities. **Clyde P. Ballard, Executive Director, Central Data Processing Authority.**

Microcomputer
Dealerships Available
to qualified companies.

Must have
- Full time sales personnel
- Real time applications programming capability
- Ability to configure microcomputer hardware
- Field Service capability
- Adequate working capital

Dealers will receive substantial discounts, complete training, development system hardware and software.
Please write outlining your capabilities relative to the above requirements.

CONTROL LOGIC, INC.
Department D
Nine Tech Circle
Natick, MA 01760

CONTROL LOGIC

NMI-75: when desk size is the right size.

The new NMI-75 is the smallest "¾ size" microfiche reader available. Base just 8" by 9½"; built-in hood extender; self-opening, smooth gliding carrier; interchangeable floating lenses; front loading electronic component drawer; universal, aspheric condenser and dichroic lamp require no adjustments; color-corrected, seven-element lens, built-in carrying handle and power cord storage; weighs under 15 lbs; dual lens and dual carrier options.

northwest microfilm, inc.
6840 Shingle Creek Parkway
Minneapolis, Minnesota 55430
Phone (612) 566-5950

COMDISCO® MEANS COMPUTERS

If you are an IBM 360 or 370 user and have plans to change equipment, call Comdisco. We will purchase your present system and sell or lease you an IBM 360 or 370. We will arrange a long-term leveraged lease or a short-term operating lease on a new or used IBM 370. Want more details? Call Comdisco.

WE BUY, SELL,
AND LEASE
IBM 360/370
COMPUTER
EQUIPMENT

370/155J-II
SALE OR LEASE

Member Computer Dealers Association

Comdisco, Inc 2200 East Devon Ave Des Plaines, IL 60018
312 297-3640 TWX 910-233-2478

COMDISCO® THE CREATIVE COMPUTER PEOPLE

Earnings Reports

WANG LABORATORIES
Three Months Ended Dec. 31

	1975	1974
Shr Ernd	$.36	$.18
Revenue	24,153,000	18,142,000
Earnings	1,479,000	738,000
6 Mo Shr	.53	.40
Revenue	42,248,000	33,896,000
Earnings	2,161,000	1,615,000

TELECOR
Three Months Ended Nov. 30

	1975	1974
Shr Ernd	$.40	$.32
Revenue	23,811,927	20,449,103
Earnings	1,115,942	890,562
6 Mo Shr	.64	.63
Revenue	41,843,596	38,157,868
Earnings	1,775,761	1,758,461

COMPUTER MACHINERY
Year Ended Dec. 31

	1975	1974
Revenue	$56,977,000	$55,124,000
Tax Cred	42,000	.....
Loss	2,604,000	3,973,000
3 Mo Shr	.07	.....
Revenue	10,295,000	13,172,000
aSpec Chg	58,000	109,000
Earnings	359,000	(3,600,000)

a-From reversal of tax-loss carry-forward.

APPLIED MAGNETICS
Three Months Ended Dec. 31

	1975	1974
Shr Ernd	$.03	$.02
Revenue	14,003,000	15,637,000
Earnings	119,000	92,000

AUTOMATIC DATA PROCESSING
Three Months Ended Dec. 31

	1975	a1974
Shr Ernd	$.62	$.50
Revenue	45,034,000	38,251,000
Earnings	4,325,000	3,449,000
6 Mo Shr	1.13	.91
Revenue	86,317,000	72,826,000
Earnings	7,914,000	6,334,000

a-Restated.

BOLT BERANEK & NEWMAN
Three Months Ended Dec. 31

	1975	1974
Shr Ernd	.....	$.24
Revenue	$6,422,300	6,531,000
aEarnings	(540,800)	b282,700
6 Mo Shr	.....	.70
Revenue	13,882,500	12,978,800
aEarnings	(652,900)	b848,900

a-Includes $344,100 charge in the quarter and $620,100 charge in the six months of 1975 and charges of $80,300 and $176,000 respectively in 1974 from startup costs of Telenet Communications Corp., an affiliate. b-Includes $308,300 gain from exchange of nonexclusive license.

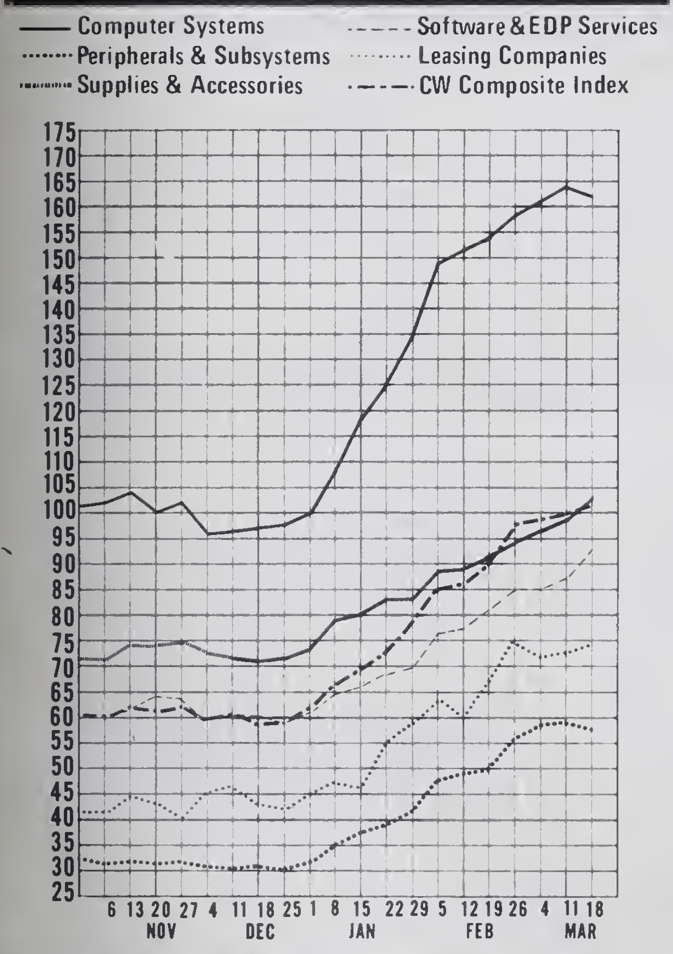
COMDISCO
Three Months Ended Dec. 31

	1975	1974
Shr Ernd	$.39	$.17
Revenue	19,067,952	12,166,477
Earnings	470,431	208,677

RECOGNITION EQUIPMENT
Three Months Ended Jan. 31

	1976	1975
Shr Ernd	$.26	$.12
Revenue	16,597,000	10,285,000
Tax Cred	577,000	541,000
Earnings	1,504,000	655,000

COMPUTERWORLD Computer Stocks Trading Indexes



Computerworld Sales Offices

National Sales Manager
Roy Einreinhofer
Advertising Administrator
Judy Milford
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Boston
Robert Ziegel
Northern Regional Manager
Mike Burman
Account Manager
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800

New York
Donald E. Fagan
Eastern Regional Manager
Frank Gallo
Account Manager
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

San Francisco
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Donna Dezelan
Account Coordinator
COMPUTERWORLD
1212 Hearst Bldg.
San Francisco, Calif. 94103
Phone: (415) 495-0990

Los Angeles
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
1541 Westwood Boulevard
Los Angeles, Calif. 90024
(213) 477-3535

Japan:
Mr. T. Kasuya
General Manager
Dempa/Computerworld
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Phone: (03) 445-6101
Telex: Japan-26792

United Kingdom:
Michael Young
Computerworld Publishing Ltd.
140-146 Camden Street
London NW1 9PF, England
Phone: (01) 485-2248
Telex: UK-26-47-37

West Germany:
Otmar Weber
Computerworld GmbH
8000 Munich 40
Tristanstrasse 11
West Germany
Phone: (089) 36-40-36
Telex: W.Ger-5-215250-HKFD

TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 17, 1976

All statistics compiled, computed and formatted by
TRADE★QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1975-76 RANGE (1)	CLOSE MAR 17 1976	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	62-109	106 7/8	+2 1/2	+2.3
O	COMPUTER AUTOMATION	2- 19	17 3/4	- 3/4	-4.0
N	CONTROL DATA CORP	11- 26	24	- 3/8	-1.5
N	DATA GENERAL CORP	10- 52	50 3/4	0	0.0
O	DATAPOINT CORP	6- 39	37	- 1/4	-0.6
O	DIGITAL COMP CONTROL	1- 4	3 1/2	- 1/4	-6.6
N	DIGITAL EQUIPMENT	46-179	172	-3 1/2	-1.9
N	ELECTRONIC ASSOC.	2- 5	4	- 1/2	-11.1
A	ELECTRONIC ENGINEER.	5- 16	15 1/4	+ 1/8	+0.8
N	FOXBORO	23- 42	35 7/8	- 3/8	-1.0
O	GENERAL AUTOMATION	4- 14	8 3/8	- 5/8	-6.9
O	GRI COMPUTER CORP	1- 1	7/8	- 1/8	-12.5
N	HEWLETT-PACKARD CO	58-120	106 1/4	-3 3/8	-3.0
N	HONEYWELL INC	22- 56	51	-1	-1.9
N	IBM	158-266	258 1/8	-3 5/8	-1.3
O	MANAGEMENT ASSIST	1- 2	1 7/8	+ 5/8	+50.0
O	MEMOREX	1- 26	23 3/8	0	0.0
O	MICRODATA CORP	2- 22	20 7/8	- 3/8	-1.7
O	MODULAR COMPUTER SYS	5- 19	10 1/4	-1 1/4	-10.8
N	NCR	15- 39	26 3/8	- 1/2	-1.8
O	PRIME COMPUTER INC	2- 10	9 3/4	0	0.0
N	PERKIN-ELMER	16- 30	23	+ 1/2	+2.2
N	RAYTHEON CO	26- 59	48 1/2	- 1/2	-1.0
N	SPERRY RAND	26- 49	46 5/8	-1	-2.0
O	SYCOR INC	5- 31	28 3/4	+ 1/4	+0.8
A	SYSTEMS ENG. LABS	1- 10	9 7/8	- 3/8	-3.6
N	VARIAN ASSOCIATES	7- 18	15 3/8	- 7/8	-5.3
N	WANG LABS.	7- 20	17 1/2	- 3/4	-4.1

LEASING COMPANIES

EXCH		PRICE 1975-76 RANGE (1)	CLOSE MAR 17 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMDISCO INC	1- 9	8	- 1/2	-5.8
A	COMMERCE GROUP CORP	2- 4	2 7/8	- 1/4	-8.0
A	COMPUTER INVSTRS GRP	1- 2	1 1/2	- 1/8	-7.6
M	DATRONIC RENTAL	1- 1	5/8	+ 1/8	+25.0
A	DCL INC	0- 1	3/4	+	+8.3
N	DPF INC	3- 7	5 7/8	- 1/8	-2.0
O	EDP RESOURCES	1- 2	1	0	0.0
A	GRANITE MGT	1- 5	4 1/2	0	0.0
A	GREYHOUND COMPUTER	2- 5	4 3/8	- 1/8	-2.7
N	ITEL	3- 13	12 1/8	- 3/8	-3.0
N	LEASCO CORP	4- 14	11 7/8	+ 1/4	+2.1
O	LEASPAC CORP	0- 1	1/4	0	0.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	NPG INC	0- 4	1/4	0	0.0
A	PIONEER TEX CORP	2- 9	7 1/2	- 3/8	-4.7
A	ROCKWOOD COMPUTER	1- 1	1/8	0	0.0
N	U.S. LEASING	7- 14	11	+1	+10.0

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		PRICE 1975-76 RANGE (1)	CLOSE MAR 17 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 1	3/4	0	0.0
A	APPLIED DATA RES.	1- 10	2 5/8	- 3/8	-12.5
N	AUTOMATIC DATA PROC	29- 65	60 1/2	+1 3/4	+2.9
O	BRANDON APPLIED SYST	1- 1	1/4	0	0.0
O	COLEMAN AMERICAN COS	4- 6	4 3/8	- 1/8	-2.7
O	COMPUTER DIMENSIONS	2- 6	5 3/4	0	0.0
O	COMP ELECTION SYSTMS	3- 7	6	+ 1/2	+9.0
O	COMPUTER HORIZONS	1- 1	1 5/8	+1 1/8	+225.0
O	COMPUTER NETWORK	1- 5	3 7/8	- 1/8	-3.1
N	COMPUTER SCIENCES	2- 8	6 5/8	- 1/8	-1.8
O	COMPUTER TASK GROUP	1- 1	1	0	0.0
O	COMPUTER USAGE	2- 6	5 7/8	+1 5/8	+38.2
O	COMSHARE	2- 4	3	- 1/8	-4.0
O	DATATAB	1- 2	1	0	0.0
A	ELECT COMP PROG	1- 1	1/8	0	0.0
N	ELECTRONIC DATA SYS.	11- 28	13 5/8	- 1/2	-3.5
O	INFONATIONAL INC	1- 1	1/8	0	0.0
O	IPS COMPUTER MARKET.	1- 1	1 1/2	+ 3/8	+33.3
O	KEANE ASSOCIATES	2- 3	3	- 1/8	-4.0
O	KEYDATA CORP	2- 5	3 3/4	- 1/4	-6.2
O	LOGICON	3- 5	4 1/8	- 1/4	-5.7
A	MANAGEMENT DATA	1- 3	2 7/8	+ 3/8	+15.0
A	NATIONAL CSS INC	6- 25	20 1/2	- 1/2	-2.3
O	NATIONAL COMPUTER CO	1- 1	1/8	0	0.0
A	ON LINE SYSTEMS INC	8- 22	19 3/8	-1 3/8	-6.6
N	PLANNING RESEARCH	2- 6	4	- 1/2	-11.1
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	RAPIDATA INC	2- 5	4 1/4	- 1/8	-2.8
O	REYNOLDS & REYNOLDS	10- 24	19	-1 1/2	-7.3
O	SCIENTIFIC COMPUTERS	1- 1	3/4	0	0.0
O	SIMPLICITY COMPUTER	1- 1	1	0	0.0
O	TYMSHARE INC	7- 28	25 1/8	- 1/8	-0.4
A	URS SYSTEMS	2- 5	4 1/4	0	0.0
N	WYLY CORP	2- 7	5 3/4	- 1/4	-4.1

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1975-76 RANGE (1)	CLOSE MAR 17 1976	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	4- 13	10 3/8	- 3/8	-3.4
O	ADVANCED MEMORY SYS	1- 10	8 3/8	- 7/8	-9.4
N	AMPEX CORP	3- 8	7 7/8	- 1/8	-1.5
O	ANDERSON JACOBSON	1- 4	3	- 1/8	-4.0
O	BEEHIVE MEDICAL ELEC	1- 5	4 3/4	0	0.0
A	BOLT,BERANEK & NEW	5- 13	8 3/4	-1 1/8	-11.3
N	BUNKER-RAMO	4- 8	6 5/8	0	0.0
A	CALCOMP	3- 7	5 1/2	- 3/8	-6.3
O	CAMBRIDGE MEMORIES	1- 5	4 1/8	- 1/4	-5.7
N	CENTRONICS DATA COMP	7- 35	29 1/2	+ 5/8	+2.1
O	CODEX CORP	15- 42	38 1/2	-1	-2.5
O	COGNITRONICS	1- 2	1 1/4	0	0.0
O	COMPUTER COMMUN.	1- 3	3 1/2	- 1/8	-3.4
O	COMPUTER CONSOLES	3- 7	5 1/4	- 1/2	-8.6
A	COMPUTER EQUIPMENT	1- 3	2 1/8	- 1/4	-10.5
O	COMPUTER MACHINERY	1- 2	1 7/8	0	0.0
O	COMPUTER TRANSCEIVER	1- 2	2 1/4	- 1/8	-5.2
O	COMTEN	2- 8	7 3/8	+ 1/8	+1.7
N	CONRAC CORP	12- 30	23	- 3/8	-1.6
O	DATA ACCESS SYSTEMS	1- 3	1 3/8	-1 1/4	-47.6
O	DATA 100	5- 16	12 3/4	+2 3/8	+22.8
A	DATA PRODUCTS CORP	2- 11	9 3/8	-1 3/8	-12.7
O	DATA TECHNOLOGY	1- 3	2 1/8	- 1/8	-5.5
O	DATUM INC	1- 2	2 1/8	+ 1/8	+6.2
O	DECISION DATA COMPUT	2- 7	3 1/4	- 7/8	-21.2
O	DELTA DATA SYSTEMS	1- 1	3/8	+ 1/8	+50.0
O	DI/AN CONTROLS	1- 1	1	0	0.0
N	ELECTRONIC M & M	1- 3	3 1/8	+ 1/4	+8.6
O	FABRI-TEK	1- 1	1 1/8	+ 1/4	+28.5
O	GENERAL COMPUTER SYS	1- 2	1 1/4	- 1/2	-28.5
N	HAZELTINE CORP	3- 12	10 1/2	+ 3/8	+3.7
N	HARRIS CORP	18- 47	46 5/8	+2 7/8	+6.5
A	INCOTERM CORP	3- 18	18 3/8	+3	+19.5
O	INFOREX INC	2- 7	5 7/8	- 7/8	-12.9
O	INFORMATION INTL INC	8- 18	17	- 1/4	-1.4
O	INTEL CORP	21-102	97	-3	-3.0
A	LUNDY ELECTRONICS	3- 7	5 3/4	- 1/8	-2.1
O	MSI DATA CORP	3- 10	6 5/8	0	0.0
A	MILGO ELECTRONICS	8- 24	16 3/8	-1	-5.7
N	MOHAWK DATA SCI	1- 7	6	- 5/8	-9.4
O	OPTICAL SCANNING	1- 3	1 1/4	- 1/4	-16.6
O	PENRIL CORP	1- 2	2 3/4	+ 1/2	+22.2
A	PERTEC CORP	2- 8	6	- 1/2	-7.6
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	1- 1	1 1/4	- 1/4	-16.6
O	QUANTOR CORP	2- 6	3 3/4	0	0.0
O	RECOGNITION EQUIP	2- 11	10 3/4	+ 7/8	+8.8
N	SANDERS ASSOCIATES	3- 11	10 1/4	- 1/4	-2.3
O	SCAN DATA	1- 4	3	0	0.0
O	STORAGE TECHNOLOGY	6- 17	12 3/8	- 1/2	-3.8
O	T BAR INC	3- 10	8 3/4	- 1/4	-2.7
O	TALLY CORP.	1- 6	5 1/2	+ 3/8	+7.3
O	TEC INC	1- 5	5	0	0.0
N	TEKTRONIX INC	18- 60	60	+2 1/2	+4.3
N	TELEX	1- 5	3 3/4	- 1/4	-6.2
O	WANGCO INC	4- 15	14 1/4	- 1/8	-0.8
O	WILTEK INC	1- 4	2	0	0.0

SUPPLIES & ACCESSORIES

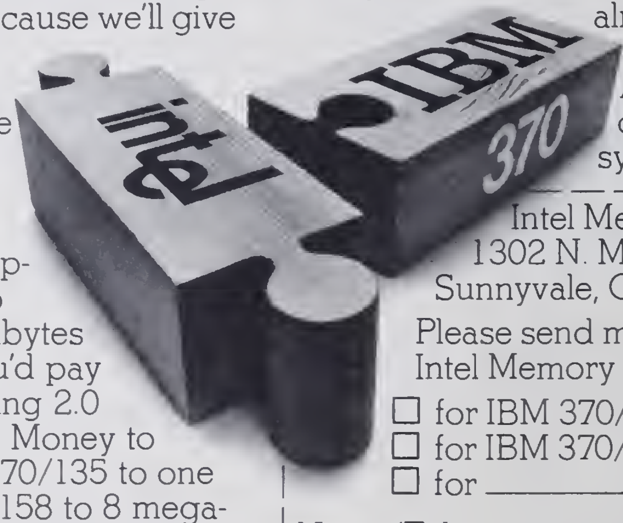
EXCH		PRICE 1975-76 RANGE (1)	CLOSE MAR 17 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED SYSTEMS INC	1- 3	2 3/4	+ 1/2	+22.2
O	BALTIMORE BUS FORMS	4- 5	4 3/4	0	0.0
A	BARRY WRIGHT	5- 9	8 1/2	+ 1/4	+3.0
O	CYBERMATICS INC	0- 1	5/8	+ 1/4	+66.6
A	DATA DOCUMENTS	29- 42	39 7/8	- 3/8	-0.9
O	DUPLEX PRODUCTS INC	12- 25	18 3/4	- 3/8	-1.9
N	ENNIS BUS. FORMS	5- 8	6 5/8	- 5/8	-8.6
O	GRAHAM MAGNETICS	5- 13	10 1/2	+ 1/2	+5.0
O	GRAPHIC CONTROLS	8- 21	18	+ 1/2	+2.8
N	3M COMPANY	43- 68	60	+ 7/8	+1.4
O	MOORE CORP LTD	39- 51	47 1/4	+1	+2.1
N	NASHUA CORP	9- 22	14 3/8	+ 1/8	+0.8
O	STANDARD REGISTER	11- 20	18 1/2	+ 1/2	+2.7
O	TAB PRODUCTS CO	4- 8	6 3/4	- 1/2	-6.8
N	UARCO	17- 25	23 5/8	+ 3/8	+1.6
O	VANIER GRAPHICS CORP	4- 8	7 3/8	+ 1/8	+1.7
A	WABASH MAGNETICS	3- 8	6 1/2	- 1/2	-7.1
N	WALLACE BUS FORMS	15- 25	23	- 1/4	-1.0

IBM 370 users: An Intel add-on memory system can save you up to 50%.

IBM means computers. Intel means semiconductor memories. And because we're the largest independent manufacturer of semiconductor memories and provide our own service we can offer you substantial savings compared to the IBM alternative. An Intel system will also help you prolong the life of your System 370 because we'll give you up to two times the memory capacity you can get from IBM, and in the original frame. That means you don't have to "trade up" your entire computer system just because you're running out of memory capacity.

You can add to or replace the IBM supplied memory. Either way you'll save up to 50%. As an example, you can get 4.0 megabytes of Intel 370/158 memory for less than you'd pay for 2.0 megabytes of IBM. That's like getting 2.0 megabytes free and with money left over. Money to use in other ways. We can expand your 370/135 to one megabyte in a single frame, or your 370/158 to 8 megabytes in a single frame. In either case that's twice the capacity offered by IBM.

If you've gone to the world's largest computer company for your computer, doesn't it make sense to go to the world's largest semiconductor memory company for your add-on memory? Intel add-on memory systems for the IBM 370/135, 370/145, 370/158, and soon the 370/168, will enable you to add more memory, in less space and at lower cost than the IBM alternative. Start saving now. Join the over 300 IBM 370 users who have already made the switch. The coupon will get you information. A phone call to any of our sales offices will get you one of our systems specialists.



Intel Memory Systems
1302 N. Mathilda Avenue
Sunnyvale, California 94086

Please send me information on the following Intel Memory Systems:

☐ for IBM 370/135
☐ for IBM 370/145
☐ for IBM 370/158
☐ for IBM 370/168
☐ for ____________________

Name/Title____________________
Company____________________ Mail Station____________________
Address____________________ Phone No.____________________
City/State/Zip____________________

intel memory systems
A DIVISION OF INTEL CORPORATION

Headquarters: California 408-734-8102, Ext. 453 • Sales Offices: California 415-692-4762, 213-640-0584 • Georgia 404-451-0486 • Illinois 312-640-0050 • Massachusetts 617-237-4673 Michigan 313-358-1640 • Minnesota 612-474-5939 • New York 212-736-0316 • Ohio 216-836-0457 • Pennsylvania 609-428-8825 • Texas 713-771-5781 • Virginia 703-790-1191